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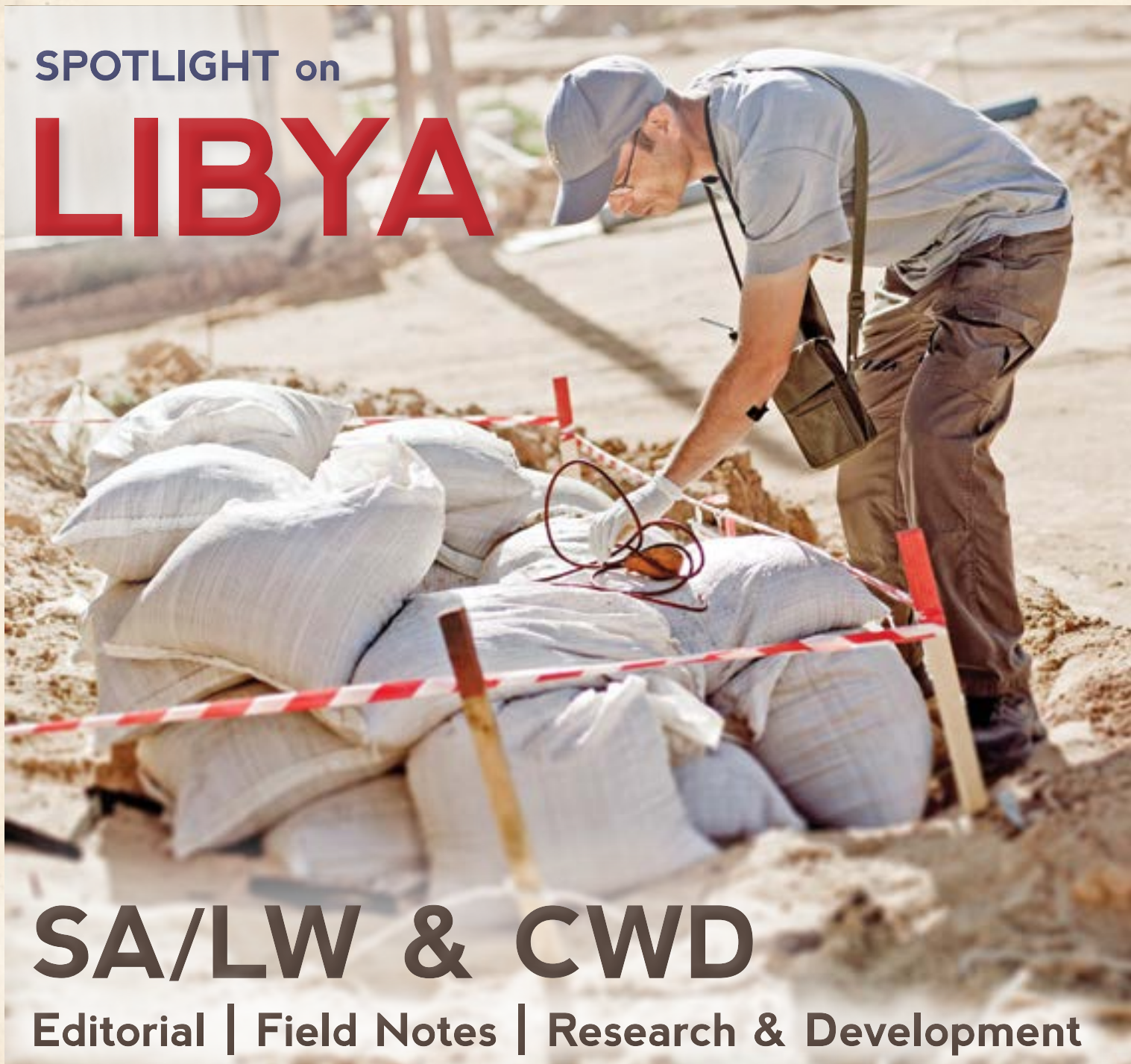
# THE JOURNAL

of Conventional Weapons Destruction

Issue 20.3 | November 2016

SPOTLIGHT on

# LIBYA



## SA/LW & CWD

Editorial | Field Notes | Research & Development

**Special Report:** SOLOMON ISLANDS' EXPLOSIVE LEGACY

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SPOTLIGHT: Bosnia and Herzegovina 20 years on

### COMING IN ISSUE 21.2 | JULY 2017

FEATURE: Evolving Nature of Survey and Mobile Technologies

SPOTLIGHT: Southeast Asia

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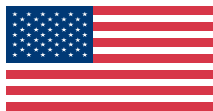
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**Cover Photo**

Unexploded objects are cleared after an explosion at a former police station in Dafinya, 30 km outside of Misrata, Libya.

Photo courtesy of DanChurchAid.



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## FROM THE DIRECTOR

Here at CISR, our team is busy planning the 13th Senior Managers' Course (SMC), which will take place in Biograd na Moru, Croatia, from 20 March to 7 April 2017. With the help of our local partner, the Croatian Mine Action Centre, CISR will implement a course designed specifically to address the needs of senior managers working in greater Southeast Europe as the region's mine action programs undergo planned transitions. The course in Croatia will be our third regional SMC (Tajikistan in 2014 and Vietnam in 2015) since we began implementing the regional format in 2014; we hope to facilitate many more over the coming years.

In this issue of the *Journal*, we turn our attention to Libya in our Spotlight section, where Damir Djakovic and Katarina Cvikel Balić from ITF Enhancing Human Security examine the explosive remnants of war (ERW) contamination response in Libya. And Nikolaj Sondergaard from DanChurchAid discusses the organization's partnership with Lebanese authorities on facilitating explosive ordnance disposal training for Libyan authorities.

In our Feature section, we focus on small arms and light weapons (SA/LW) and conventional weapons destruction. In their article, "Gendered Vulnerabilities to Small Arms in South Central Somalia," Abigail Jones (Danish Demining Group), Nicola Sandhu, and Lucas Musetti (Gender and Mine Action Programme) assert that a better understanding of gender-related behaviors is needed to encourage positive behavior change with regard to SA/LW and argue that future analyses and activities should be designed and implemented with sensitivity to gender, tribe, clan, age, and wider community relations in South Central Somalia.

Furthermore, we have a fascinating article for this issue's special report from Mette Eliseussen and John Rodsted (Safeground) on the Solomon Islands. Through photography and interviews with Islanders, the authors report on the ERW contamination left over from World War II that still significantly affects Islanders' lives, vocations, and safety, as well as the islands' topography, specifically its endangered coral reefs.

Looking ahead, Brad Alford and Michael Kennedy from Janus Global Operations, LLC preview our upcoming issue on improvised explosive devices (IED) with their article "Adapting the ERW Community to Combat IED Threats." I am very excited for issue 21.1, which will be published in March 2017, and will feature IEDs and pressure plate IEDs. As the number one cause of military casualties for many nations, these weapons continue to pose an increasing threat to civilians in Afghanistan, Iraq, Libya, and Syria, and are now becoming an increasing threat in Europe, the United Kingdom, and the United States.

Also in 21.1, our Spotlight section will focus on Bosnia and Herzegovina. Following the end of the Bosnian War in December 1995 and the Balkan floods of May 2014, Bosnia and Herzegovina continues to suffer from landmines and ERW contamination. Having toured the country with Diana, Princess of Wales, in 1997, this country and its lingering effects from landmines and ERW is something very close to my heart. We encourage individuals, NGOs, and all those working in humanitarian mine action to submit articles on lessons learned and the ongoing challenges for programs in this region. ©



Ken Rutherford  
CISR Director

## The Role of Research in Mine Action: A Response to Gasser

by Ian G. McLean, Ph.D. [ Consultant ] and Rebecca J. Sargisson, Ph.D. [ University of Waikato ]

Some years ago, a businessman came to me and said that he would like to start commercially farming lobsters, something that had not been attempted at the time. His key question was, “How long will the development research take?”

“I would think two to four years before a scaling-up exercise to make it commercially viable,” I answered.

Looking genuinely surprised he replied, “Really! I was thinking it should take about two weeks.”

This anecdote portrays a problem that emerges in almost every area of human enterprise. Those-who-do want and need to do right now. Those-who-create need time to design, build, and prove their creation. The time scales are fundamentally incompatible. Russell Gasser refers repeatedly to this problem in his editorial in issue 20.1 of *The Journal of Conventional Weapons Destruction*.<sup>1</sup> He also commits clearly to the side of the doer. His argument: the role of researchers (in mine action) is to service the needs of practitioners. They should do so quickly, cheaply, and with careful attention to the specific needs of the moment.

Gasser argues that incremental research (IR) is more beneficial than research into new technologies. As defined by Gasser, IR consists of improvements in design and/or productivity of equipment already in use. He points to the metal detector as a tool that was improved significantly over time by manufacturers through incremental improvements. Of course, it is unlikely that the manufacturers were improving their products specifically for mine action, which is only a small part of their market. Rather, mine action benefitted from developments that improved a tool for multiple applications. Those improvements would have emerged from research, albeit hidden from the view of operational demining.

Gasser states that much of the research in mine action has not directly benefitted the industry. However, researchers have broader goals than addressing specific and current problems.

For example, research on detection of landmines and unexploded ordnance (UXO) by animals may (or may not) benefit demining at the time, but the lessons learned from that research can cross over into other endeavors. Examples include mine detection rats re-tasked to detect tuberculosis, or dogs, which are well

known explosive and drug detectors that can also detect cancer, weeds, or bed bugs.<sup>2,3,4,5,6</sup> A key benefit of research is that, successful or not, it leads to unanticipated advances and further developments in the same or related fields. In this sense, all research is a process of “incremental improvement” and does not necessarily seek “breakthroughs” as Gasser claims.<sup>1</sup>

The issues with humanitarian mine action that Gasser describes from the 1990s were key reasons for establishing the Geneva International Centre for Humanitarian Demining (GICHD) in 1998. Humanitarian demining was an emerging profession, and there was considerable variation in the quality of the end product (mine-free land). Some technologies, such as mine detection dogs, needed to be better understood, and there were safety issues with human deminers. A combination of quality control through standards and research was needed to stabilize the industry and improve confidence.

The GICHD established itself as a research leader by employing professional researchers to manage projects and work with consultants. It ensured that the results of that research were communicated to the industry through multiple channels including written reports, face-to-face meetings, field-based conferences, and training videos. Most of Gasser’s examples refer to proposals and developments from more than a decade ago. Much of the international interest in the landmine issue in the 1990s and early 2000s can be attributed to Diana,



**“A key benefit of research is that, successful or not, it leads to unanticipated advances and further developments in the same or related fields.”**

Princess of Wales, and the signing of the *Anti-Personnel Mine Ban Convention* (APMBC). It is not surprising that developers of new technology that might (or might not) have a demining application seized the opportunity to seek funding for their projects. After all, research is an enterprise and is subject to the ebbs and flows of societal trends, just like any other business. However, most money budgeted by governments and donors for research must be spent on research. It is not appropriate to imply that the money spent on high-tech developments was somehow taken away from operational demining, as that money was never available to operations anyway. Competition for research funding is intense, and there were presumably opportunity costs in that some other research activity was not funded when the money went to a demining application. That alternative might not have had anything to do with demining.

Nor is it appropriate to suggest that the research was not beneficial, even if it did not result in a useful demining application. In his second point, Gasser states that research should improve equipment that is already in use. He refers to a failed project and notes that the limited learning from it did not benefit deminers. Innovative research is not a process with guaranteed outcomes, as it involves exploration of the unknown. Failure is frequent, and a good researcher will learn from that failure. The IR advocated by Gasser is cautious, limited in scope, and minimizes innovation. True, its outcomes are generally more assured and its failings less costly. But the reality is that both incremental and innovative research are needed if genuine advances are to be obtained.

In his fourth point, Gasser argues that the people who reviewed complex research proposals 20 years ago were either academics or military personnel, neither of whom understood humanitarian demining. The “wrong” projects were supported as a result. While there is some truth to the first part of the argument, he fails to link decisions of the past with the situation today, and we struggled to find any relevance to current realities in his arguments. The people who made those decisions no doubt believed they were the best decisions at the time. Retrospective criticism devalues their hard work without adding any value to future decision making.

However, Gasser is right that cynicism about the value of research was rampant in the industry at the time, and this editorial indicates that it has not waned. The deep gulf between practitioners and researchers captured in the anecdote at the beginning of this commentary is no more easily bridged today than it was in the past. Researchers struggle to find the time to promote the results of their work beyond standard reporting (papers and presentations) and tend to assume that role will

be taken up by others. The GICHD recognized that problem and invested significant resources into building that bridge, although with only partial success.

In his conclusion, Gasser asks for a community of practice and better promotion of low-tech ideas that were developed and implemented on a local level. The latter proposal appears to be similar to the equipment catalogues produced regularly by the GICHD since 2003 but with additional, non-commercial ideas from the field included. Realistically, it should be people who work for support organizations such as the GICHD who capture those ideas and transfer them elsewhere during their work programs. The notion of a community of practice was trialed in several ways by Håvard Bach over some years, but those initiatives foundered on the very realities of demining practice that Gasser describes.

Gasser ends with a question about funding discrepancies. We argue that the discrepancy is mostly a myth, as money spent on high-tech products was unlikely to have been available to demining practitioners. A likely explanation for the funding biases described by Gasser is that projects researching incremental improvements to standard demining tools were of relatively low cost. There are published descriptions of such research from the time of primary interest to Gasser.<sup>7,8</sup> If more was needed, we suspect that funding restrictions were not the reason for its absence. ©

See endnotes page ##

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# RBM and Theories of Change

by Russell Gasser

“Give me your money; I’m busy doing things” is not the most convincing fundraising appeal. Instead, “Look at the difference our program has made to the lives of the people that were helped” is far more likely to get a positive response. The overall purpose of mine action is to improve people’s lives and livelihoods, to reduce casualties, and increase compliance with political commitments like the *Anti-Personnel Mine Ban Convention* (APMBC). Although this is widely known, standard reporting excessively includes information on how many people received risk education, how many square meters of land were cleared, or how many people attended a training session. In other words, they report activities instead of outcomes. This information tells the donor that the mine action organization was busy but does not tell donors whether their money made positive, long-term differences in beneficiaries’ lives, nor does it help donors understand if the work was good value for money overall. To make a difference, implementing organizations need to know what success looks like and how to report it correctly. Even more important is the need to learn from experience, avoid repeating errors, and identify good practices and clever solutions for future use. Successful mine clearance is not measured by how many mines were removed but by the overall impact on the beneficiaries, the local communities and nations where they live, and how much the organizations involved were able to learn and implement continual improvement.

It’s not enough to be busy. Risk education only makes a difference if as a result people change their everyday behavior. Clearing farmland only makes a difference if local people productively use the land once cleared. It’s tempting to measure time spent, but what really matters are results. This means that success can only be measured well after a mine action intervention is completed.

This is not a new issue. Results-based management (RBM) started about 50 years ago. In the 1960s and 1970s, when national governments realized that it was not useful to measure social welfare programs by how much money they spent; New Public Management began measuring the results instead.



Figure 1. The results-based methods pocket toolkit.  
All graphics courtesy of author via [resultsbased.org](http://resultsbased.org).

RBM uses the same ideas and is experiencing a donor-driven resurgence. Unless donors continuously insist on using RBM, a cycle occurs where RBM is promoted with great enthusiasm and then gradually forgotten over the space of several years. Once time, money, and effort are spent on programs to ensure that RBM is successfully implemented, organizations tend to return to business as usual, and the focus on RBM is reduced or lost without pressure from donors.<sup>1</sup>

RBM is a method of ensuring quality management (QM) for donor funding. The very widely used International Organisation for Standardisation ISO 9001 approach is based on QM for customer-supplier relationships. Quality is defined as “making sure that customer expectations are met or exceeded.”<sup>2</sup> The underlying thinking is that a business without satisfied customers has two choices: improve quality or go bankrupt. Going out of business because local beneficiaries are unhappy is not often part of the donor-funded approach. In donor-supported programs, implementers normally spend other people’s money according to an overall plan that the field-partner did not write (perhaps a national plan) in order to deliver goods or services that will help people whom the donor does not know and will never meet. No single customer-supplier relationship exists that can be implemented for overall QM or to measure value for money. In other respects, the ISO 9001 method and the seven core principles of the 2015



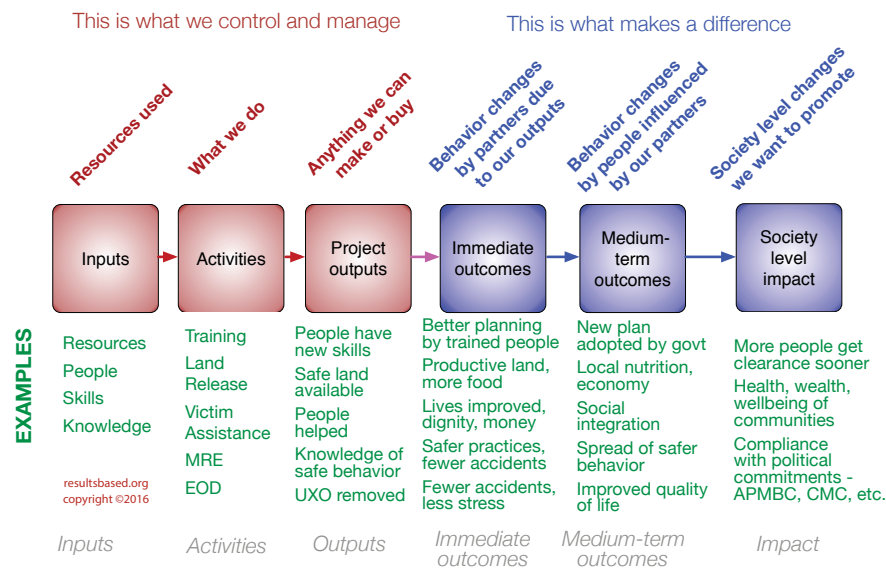


Figure 2. Mine action results chain diagram.

version can be used to improve the quality and value of donor-funded work through RBM and QM.

One of the new phrases for RBM is theories of change, which describes and summarizes how the intervention will bring positive changes to people's lives. It describes why spending donor money will lead to activities in the field, and why this will improve the lives of local people, whereas the work plan outlines how this will happen.

Although there is an argument among academics about the exact definition, theories of change for mine action as well as weapons management and destruction activities are evidence-based and have three, widely-accepted core parts:

1. Results chains describe the elements that links inputs to results and are often drawn as a set of five or six boxes in a row (i.e., a results chain diagram).
2. Causal links represent "if this, then that" cause and effect evidence of why change will happen.
3. Assumptions about the context of the intervention that are necessary for success.<sup>3</sup>

All three must be included in a theory of change. A change model diagram is not a theory of change by itself.

Historically, planners wrote about the hypothesis of the intervention.<sup>4,5,6</sup> Most donor-funded programs are, in essence, social science experiments. However, instead of working with volunteers (or rats) in a lab, we are spending real donor money to achieve behavioral changes in the lives of real people. Ideally, if the project delivers the planned activities, then people will change their behavior. This is so familiar that planners and implementers sometimes forget it is an experiment. If

we deliver risk education, then people will change their high-risk behavior. If we clear this land, then people will use it to grow food. If we train people in planning skills, then a better national plan will not only be written but also implemented. Sometimes we make a false assumption that project inputs will automatically lead to the desired results. For example, a project must actually verify that people change their behavior after receiving risk education in order to show that the theory of change is correct. Typically, this can only be done long after the end of a short-term project, which is often a problem when donors want evidence of success immediately. A full year of an agricultural planting and harvesting cycle may be needed to show that the cleared land was put into productive use. The deeply ingrained idea that mine clearance has an impact as soon as the land is handed over needs to change. Similarly, donors should understand that the evidence of success they need cannot immediately be produced as soon as funding ends.

Training projects that teach planning skills are a good example. Considerable time and many different people outside of the project may be needed to achieve the desired result, such as a well written and adopted national plan. Implementing the plan after it's adopted is even further removed from the objective of the training. Because someone finishes the initial training does not guarantee that they will eventually write a plan that is implemented. Maybe the person finds another job soon afterward, and the plan is never written. Maybe the plan is written but rejected by the government. In these cases, the impact of the training project will be zero despite delivery of the planned activities.

Result level names	Intended changes	Indicator difficulty
Impact or Strategic Objective	Changes to beneficiaries, lives at a community or society level	Hard. Long delays. Often very indirect information. External factors very important. Unrealistic in less than three years.
Intermediate Outcome or Medium-term Outcome	Change in behavior by people influenced indirectly	Moderate to hard. Can be indirect or very indirect. Delay after activities end. External factors will be important (attribution issues). May include qualitative and hard to analyze. <i>Important for determining success.</i>
Immediate Outcome	Change in behavior by people directly in contact with outputs	Moderate. Short delay. Usually directly available. External factors quite important. Often quantitative or pseudo-quantitative. <i>Important for determining success.</i>
Output	Anything we make or buy	Easy or moderate. Needs to be designed into activities. Equivalent to Kirkpatrick level 2 evaluation.
Activity	What we do	Directly available from project management information - in well organized activities, minimal effort needed. Does not indicate success.
Inputs	Quantity of resources used	Standard accountancy and audit.

Table 1. Key indicators in mine action.

Typical IMPACT	Economic Political APMBC, CMC	Health Wellbeing	Health Economic Political APMBC, CMC	Health Economic	Economic
Typical OUTCOME INDICATOR	Land in productive use Value of crops	Injuries averted Anxiety reduced	Injuries averted Number of UXO reported.	Injuries averted Anxiety reduced	Number of decisions/plans improved by IM GIS information
Typical OUTPUT INDICATOR	Square metres of safe land	UXO destroyed	Number of people informed	Number of tons (or items) safely stored	More and/or better information
ACTIVITY	Land release	Explosive Ordnance Disposal - EOD	Risk Education - MRE	Ammunition Safety Management ASM (PSSM)	Information management and GIS

Table 2. Difficulty of collecting data for mine action indicators.

Similarly, recording the number of people attending an RBM course does not indicate that an organization is following an RBM approach. Success occurs when the organization yields behavior change by using RBM (outcome). As a result, the organization is transformed into a more efficient, responsive system that learns and improves (long-term impact).

Actual projects are never simple and are often unable to deliver exactly what was intended in the planning phase. To account for this, we identify the key assumptions on which the planning logic depends. These external assumptions are issues that are beyond the control of the project. Typical assumptions include a stable political situation, the cessation of armed conflict, and the provision of adequate office space,

salaries, and computers for planning staff by the national authorities so that staff do not seek other jobs. The availability of the necessary tools and supplies to start food production on cleared land is another common assumption.

Some RBM specialists argue that knowing how to measure the success of a result should be the starting point of any planning process. Unless everyone involved from donors to beneficiaries can agree on the definition of success, and the project has the means to recognize long-term success, there is a risk that the intervention will accidentally support failure. Unless success is clearly understood, defined, and measured, it cannot be properly separated from failure. Being busy is not a measure of success. Before starting field work and even before making detailed plans, project participants and funders need to define success and measure the situation. Before and after measurements are essential in order to illustrate that the project has made a difference. A single measurement at the end of a project cannot show that there has been a change. If the benefits cannot be identified or if the project does not include the necessary resources to analyze the benefits after activities have ended, it is not possible to justify claims of success. Hard work and optimism for good results is not a strategy. Positive changes have to be attributable to the activities that were funded, not just a fortunate coincidence.

Measuring the inputs to a project, the activities completed, and the resulting outputs is a matter of administering, accounting, and auditing, and should be straightforward in a well-run organization. In contrast, measuring outcomes (behavior changes in other people) and impacts (long-term societal level changes) cannot be done directly and requires the

use of indicators to demonstrate what is happening. The purpose of indicators is to understand why the project developed as it did, to improve upon the project, learn from the experience, and report the project's results. John Mayne, a leading RBM specialist, wrote "the aim of measurement is to acquire some insight and develop some comfort that the program is actually having an impact."<sup>7</sup> Understanding and improvement is the main goal, not justifying activities to a donor.

Identifying the difference that was made to the lives of beneficiaries and the value for money that donors can expect is essential; planning begins by first defining success. Donors increasingly expect this information and will prefer to fund implementers who include it. However, the biggest advantage of RBM is learning how to work better, how to avoid or solve problems, and how to learn and reuse solutions and skills. ©

*See endnotes page 66*

#### **Russell Gasser**



Russell Gasser started working in mine action 20 years ago. He has been an official of the European Commission in Brussels, an independent evaluation consultant for eight years, and until recently, was on the staff of the GICHD. His current focus is on results-based management, theories of change, and evidence-based evaluation, as well as technology for mine action and the Cynefin framework.

**Further information about the results chain diagram, theories of change, and indicators can be found on the author's website: [resultsbased.org](http://resultsbased.org).**

## FEATURE

# GENDERED VULNERABILITIES TO SMALL ARMS IN SOUTH CENTRAL SOMALIA

by Abigail Jones [ Danish Demining Group ], Nicola Sandhu, and Lucas Musetti [ Gender and Mine Action Programme ]



Danish Refugee Council (DRC)/Danish Demining Group (DDG) small arms risk education training in 2015.  
All photos courtesy of Abigail Jones.

**S**omalia is a very young nation demographically; estimates place half the population under the age of 14 and less than five percent over the age of 60.<sup>1</sup> A large portion of the population grew up during incredible civil instability and violence, making exposure to armed violence an ever-present prospect. Further, the presence of more than one million displaced persons and refugees exacerbates the difficulties of protecting vulnerable groups from violence.

Key factors contributing to armed violence and prevalence of small arms in Somalia include clan and subclan rivalries over resources; the 20-year breakdown of the federal state that lead to the importance of clan or subclan identity for survival; marginalization of nonpastoral clans and non-Somali tribes; external funding for extremist Islamic ideology

and the presence of groups such as al-Shabab; as well as lack of a legitimate outlet for justice and grievances. In addition to these factors and despite government efforts toward civilian disarmament, ownership of officially registered firearms in Somalia is legal, which has contributed to the prevalence of weapons in the country.

Weapons ownership is attached to masculinity in Somali culture, and boys will sometimes receive a weapon as a symbol of manhood.<sup>2</sup> According to a 2015 Danish Demining Group (DDG) impact assessment, young men aged 13 to 30 are often seen as the main perpetrators of armed violence, especially as they are the most at risk for recruitment into armed groups including al-Shabab; Islamic State group; Galgadud, Khatumo State, and other clan militias. Due to the lack of employment





DRC/DDG small arms risk education training in 2015.

opportunities, young men are increasingly resorting to criminal activity such as carjacking, extortion, kidnapping, and assassinations.<sup>3</sup> Young men in Somalia are also known to use weapons to rape, or commit other acts of sexual violence against women.<sup>4</sup>

### FACTORS CONTRIBUTING TO GENDERED VULNERABILITY TO SMALL ARMS

In humanitarian mine action, gendered daily routines and mobility patterns expose people to landmines differently, and evidence suggests this is also the case with small arms in South Central Somalia. Secondary research indicates that the more significant danger posed to men from small arms is related to the idea that weapons are linked to masculinity. In Somali culture, owning a weapon is related to status, and firearms are directly linked to the role of protector. For Somali men, this involves protecting family, clan, livestock, and livelihood, especially in pastoral communities. Given the lack of a formal justice system, protecting the clan can also include revenge violence on those who attack clan members. The justice-system vacuum has been filled with traditional Somali or Xeer law, which demands armed retribution if arbitration over a slain clan member, usually blood money, fails to materialize. However, only men (15–45) are allowed to be targeted, as women, children, and the elderly are considered off limits.<sup>3</sup>

Furthermore, anecdotal evidence suggests the activities that put men at risk of accidents involving firearms are distinctly gendered. Men are often injured as a result of improper weapons handling or storage—a result of insufficient training. Peer pressure is a key factor motivating younger men to handle and use firearms in unsafe ways. DDG staff highlighted the fact that unsafe storage—for example keeping the weapon and ammunition together—can lead to accidents.<sup>4</sup>

Alternatively, Somali women reportedly have a very different exposure to weapons as, in Somali culture, they do not typically own firearms. Most women who do are either widows or wives of men who left the family and their guns behind for their sons to use when they are older. Apart from these scenarios, women are primarily exposed to firearms through their role as keeper of the household, where they have the responsibility for any firearm within the home. This leads women to view firearms as higher risk within the home than their male counterparts do.<sup>2</sup> In the 2015 DDG impact assessment in South Central Somalia, 25.6 percent of female respondents in Banadir cited domestic violence involving firearms as one of their primary safety and security concerns. DDG staff in South Central Somalia highlighted examples of unsafe weapons storage in places accessible to children, as well as storing the weapon loaded and without

the safety catch on, which has led to accidental discharges.

### THE GENDERED EFFECTS OF SMALL ARMS INCIDENTS

For the household head, whether male or female, an inability to work and support the family due to a disability caused by a small arms incident can lead to significant psychological suffering and isolation. In addition, it can lead to family breakup and divorce if a man can no longer provide for his wife and children. In the case of women, the significant difference is that a woman who gets disabled by a small arms incident can also become more vulnerable to rape or gender-based violence. Her injury can result in the husband taking an additional wife if she is not perceived as physically able to carry out her domestic tasks. With girls, securing a marriage partner will be extremely challenging due to negative perceptions of disabilities in the community. For boys, it is reported that disability can cause social isolation, which can lead to substance and drug abuse and, in some cases, suicide.<sup>4</sup>

### AVAILABILITY OF DATA TO SUPPORT THE ARGUMENT

To provide evidence of the different effects of small arms on women, girls, boys, and men, an analysis of data disaggregated by sex and age is essential, which includes data on firearm ownership, firearm-incident reporting, and casualties. At present, significant gaps exist in the availability of quantitative data.

In 2007, the Small Arms Survey ranked Somali firearm ownership per capita at 66 of 178 countries.<sup>5</sup> However, due to ongoing insecurity and access challenges, tracking the exact number of small arms in Somalia is extremely difficult since firearm ownership is legal, but no central or local records exist to show how many are circulating.<sup>3</sup>



DRC/DDG small arms risk education training in 2015.





DRC/DDG small arms risk education training in 2015.

In a context where the federal government does not control the entire territory, and the local population has little confidence in state institutions, data compiled on reporting of firearm-related incidents to the police will not reflect the problem's true extent. Data compiled through the 2015 DDG impact assessment showed that in South Central Somalia a relatively low percentage of the population would report if they were a victim of crime or a violent encounter: Abudwaq (51.8 percent), Gedo (37.5 percent), and Banadir (63.2 percent). In addition, the reporting of firearm-related incidents to police varied across the different geographic areas: Abudwaq (20 percent), Gedo (63 percent), and Banadir (24 percent). Within these figures, female respondents were less likely to report the incident to the police.

DDG states that most victims of firearm-related violence are men between the ages of 17 and 38 years.<sup>2</sup> Yet accurate data on incidents involving small arms that lead to injury or death is not available. In 2015, DDG attempted to track this data in Puntland by visiting individual hospitals in Ayn, Bari, Karkar, Mudug, and Nugal as well as through liaison with the Ministry of Security. However, this data was not disaggregated by sex and age, and at the time of writing, no such effort had been made. Also notable is that, for many families in South Central Somalia, significant access constraints—such as a lack of financial resources to travel to the hospitals—can further distort the accuracy of the data.

## CONCLUSIONS

The lack of accurate sex- and age-disaggregated data on firearm ownership, firearm-related incidents, and casualties means that the argument on gendered vulnerability to small arms is drawn from secondary research, perception data, and qualitative information. The Gender and Mine Action Programme (GMAP) and DDG believe that to encourage positive behavior change with regard to small arms, a better understanding of gender-related behaviors drawn from an analysis of quantitative and qualitative data is needed. This will allow organizations carrying out small arms risk education (SARE) to identify target groups, develop appropriate risk communication messages, and measure the results of SARE initiatives. At the same time, based on indications showing specific gender and diversity vulnerabilities to small arms, GMAP and DDG argue that future analyses and activities should be designed and implemented with sensitivity to gender, tribe, clan, age, and wider community relations in South Central Somalia. ©

*See endnotes page 66*

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FEATURE

# ADAPTING THE ERW COMMUNITY TO COMBAT IED THREATS

by Brad Alford and Michael Kennedy [ Janus Global Operations, LLC. ]



IED charge fitted for anti-lift.  
All photos courtesy of Janus Global Operations.

In Iraq and other regions soon to be liberated from the Islamic State of Iraq and the Levant (ISIL), recovery and stability efforts are hindered by improvised explosive devices (IED), which threaten civilians returning home and/or assisting with reconstruction. According to *Relief Web*, the Anbar Provincial Council “discourage[d] the premature return of internally displaced persons (IDP) to Fallujah due to the remaining IEDs left behind by the Islamic state of Iraq and al-Sham (ISIS) militants.”<sup>1</sup> This threat, coupled with the consequences of an asymmetrical conflict, has changed the operating environments encountered by organizations that respond to explosive remnants of war (ERW). In order for post-conflict explosive hazard search and removal activities to stabilize these areas, organizations must be prepared to adapt to the dynamic and challenging environments that are associated with improvised explosive device disposal (IEDD).

With origins seated in specialized military and police counter-terrorist explosive ordnance disposal (EOD) teams, IEDD incorporates experience from a wide spectrum of conflicts and forms

a distinctive branch of the wider EOD discipline. The practice is often difficult and costly as it requires specialized equipment and advanced training. The difficulty and ambiguity of the IEDD tasks, along with the potential catastrophic consequences of accidental detonations, have long made it an exclusive activity for military or special police units. In recent years, the prevalence of the IED threat has resulted in IED awareness and search skills training to the vast majority of personnel deployed in conflict operations. Since an IED is considered a weapon from combatants, organizations that conduct IEDD are faced with similar security challenges as militaries and local police. This integrated understanding of explosive hazards and their operational impacts has reached ERW removal organizations. This prompts the question: how can existing mine action organizations and personnel adapt to address this threat and effectively support stability operations?

## DISTINGUISHING MINE ACTION FROM IEDD

ERW removal and mine action organizations have a wealth of experience operating in post-conflict areas to remove explosive hazards. Some organizations have categorized IEDs as a type of improvised landmine in order to catalogue and address it within the confines of their scope and mandates. However, IEDs can vary greatly, even in the same operational theater. This variation can be in the form of a simple pipe bomb used by ISIL as a hand grenade to a multi-switched device incorporating multiple main charges.

The battlefields of the 20th century were often open areas, fought between traditional force-on-force opponents using conventional ordnance, which included mines that were placed as both barrier obstacles, as well as nuisance minefields, targeting vulnerable points such as bridge abutments or landing strips. The vast majority of these mines were non-electrical and recognized and approved render safe procedures (RSP). They were often placed in areas that could withstand a high order detonation, if demolition in situ was required. Due to the materials and methodology used in the creation of these devices, historical means of recognition and



Suicide IED belt found in Ramadi, Iraq.

the ability to reference technical publications to determine a suitable RSP are less valuable. Not only have the means of disposal changed, but search procedures can differ when working with IEDs. For example, a road that might have a crush wire IED will likely have a switch, which is difficult to detect with traditional demining procedures unless search teams are equipped with the training and equipment specific to IED threats. These factors reduce the suitability for a traditional demining approach and require the adaptation of new training and procedures, which are principally taken from recent military experience.

ISIL and groups like the Taliban are now aware that non-military actors will be used to search and clear areas after they were forced to withdraw. It serves their interest to make clearance organizations' tasks difficult. It is critical that organizations understand that IEDs in liberated areas are still serving ISIL's purpose of harassing and restricting movement through death or injury. Incorrectly categorizing all IEDs in liberated areas as abandoned or legacy devices or as simple conventional mines creates further risk to life and property. When ISIL places IEDs in houses, schools, government buildings, and other critical infrastructure points, they are actively targeting the credibility of the local authority. The inability to dispose of these IEDs can adversely affect the confidence that the local populace has in said authority. This can lead to discontent, which can devolve into further violence. This has proven to be an effective Taliban tactic, technique, and procedure (TTP) against the government of Afghanistan. The Taliban has utilized IEDs to actively disrupt the government's ability to provide the fundamental services required to affirm its authority.

Traditionally, most community-based ERW removal organizations were considered noncombatants. Community-based mine action organizations in Afghanistan remove devices left behind from previous wars. The Taliban and ISIL

view IEDs as weapons, and disposing of these weapons causes insurgents to react with hostility and see mine action organizations as combatants. In Afghanistan, mine action organizations are advised to never destroy IEDs and instead report them to local authorities to avoid violent reactions from the Taliban. Organizations that are conducting IEDD operations must adapt to this important risk and provide the proper security and risk management from being targeted by insurgent groups.

### LEARNING FROM EOD EXPERIENCE

Organizations involved in post-conflict ERW removal can benefit from the experience of IEDD operators in approaching these items with philosophies and principals specific to IEDs as opposed to mines. Traditional unexploded ordnance (UXO) clearance operations relied heavily on technical publications of recognized RSPs for specific conventional ordnance and military booby trap switches. Since each encountered IED can vary greatly in terms of materials and deployment, the traditional ERW RSPs counter the nature of the improvised threat. Militaries adapted to this by adopting a philosophy of approaching each IED as a unique threat and have applied this in their training.

IED RSPs do not always mirror UXO procedures. For example, IEDD principles encourage standoff distances and devices such as remote control vehicles (RCV), unmanned aerial vehicles (UAV), or hook and line kits to conduct circuit disruption from a safe area. Additionally, due to the preponderance of electrically initiated IEDs, water-based disruptors are often used to achieve neutralization. These can include improvised general emplaced disruptors made from water bottles and detonating cord.

Why conduct an RSP versus destruction? There might be opportunities to dispose of an IED in situ, where bulk explosives are used to cause a high order detonation of the device. Although this can be the safest and easiest option, destruction in situ can present problems. Common obstacles include: the unavailability of explosives, potential damage to the surrounding area, and unclear legal authorities to conduct high order detonations in the host country. Destruction of an IED in situ can also expose an operator to a viable device for longer than necessary. For example, when dealing with a pressure plate IED, if the IEDD operator intends to destroy it in situ, the operator needs to achieve intimate contact between the IED's main charge and an explosive donor charge (unless



UXO scrap from a single sector at Al Anbar University, Iraq.

they have access to a shaped charge or large amount of bulk explosives). If the pressure plate is adjacent to or directly above the main charge, the operator will need to spend a considerable amount of time feeling for the main charge while in close proximity to the firing switch. The resultant explosion may also interfere with other IEDs in the vicinity, thus increasing the hazard. Therefore, even if an IED can be destroyed in situ, the operator might still elect to follow RSPs and disrupt the power source remotely or semi-remotely.

### DEFINE AND UNDERSTAND THE THREAT

The pressure plate IED (PPIED) became synonymous with Afghanistan. Although the Taliban also deployed vast numbers of devices that were self-detonated, or detonated via radio control or command wire, the PPIED often posed the greatest challenge to Coalition Forces. Although many variants were deployed, the general tactic was identical. The device was concealed and buried in the ground with a simple electrical circuit utilizing a firing switch created via two contacts held in the open position by spacers. When the weight of the target is applied to the pressure plate, the contacts come together, the circuit completes, and the device detonates.

Previously in Iraq, PPIEDs were used on a small scale against Coalition Forces. ISIL, however, has used PPIEDs and other victim operated IEDs (VOIED) in vast quantities. These have often been emplaced in a defensive manner in order to restrict avenues of approach as the Iraqi Army begins their offensive ground operations to liberate ISIL-controlled areas. They often deployed PPIEDs in a manner similar to conventional barrier minefields, linking natural obstacles. These

devices, like those in Afghanistan, continue to utilize a simple firing circuit with a normally open switch.

A key factor for organizations to consider during IEDD operations is that the batteries powering many IEDs have unusually long life spans. Many IEDs are designed to not draw any current from the IED's power source. When compared to the shorter life of a standard nine-volt battery in a house smoke alarm, ISIL devices may be viable for several years after they are emplaced. The number of IEDs that have functioned in the Al Anbar Province of Iraq 8–10 months after the area was liberated clearly demonstrates that batteries contain enough voltage to detonate these devices.

ISIL has taken the effectiveness of pressure plate IEDs and has sought to develop devices and tactics to further optimize VOIEDs in the urban environment. As identified in Al Anbar Province and other areas, ISIL made extensive use of a variety of IED types in homes, schools, factories, and infrastructure like water, power, and sewage plants. These include trip wires, crush switches, hydraulic switches, anti-lift triggers, and a variety of pull switches. The vast majority of these VOIEDs normally employ an open firing switch that functions as a result of a door being opened, an object being moved, or a person walking through a doorway. This again means that there is no electrical draw of the power source and the device can stay viable for an extensive period of time.

### TRAIN FOR THE THREAT

**IED Search and Detect Operations.** Training in open-area, route, building, and infrastructure search and detect (SnD) procedures is essential to meet the challenges posed in





IED search operations at Al Anbar University, Iraq.

urban post-conflict zones. These procedures take a systematic approach depending on the terrain and environment while also assessing the intent and capability of the device user. This approach can vary considerably from the use of instruments on un-prepared surfaces to utilizing visual checks in buildings and on prepared surfaces.

A key difference between SnD and manual minefield clearance is the adoption of IED threat assessment into planning the safest and most appropriate search procedure. For example, the crush wire switch is difficult to detect both visually and via search equipment. Instead, the adopted search procedure should be focused on initially avoiding areas where the crush wire switches are likely laid. Instead, the searcher locates other components of the IED, such as the main charge. Once a searcher detects a possible device, it is marked and reported to an IEDD operator for an RSP or disposal.

**IED Disposal Operations.** IEDD-qualified staff need to be conversant with both conventional ordnance and the full array of IEDs. As IEDs vary considerably, training must introduce the student to various devices instead of specializing in one specific device type. Detailed training in explosive theory (including the use of homemade explosives), IEDD philosophies and principles, task scene management, and threat assessment and execution all need to be covered specific to IEDD. The current International Mine Action Standards (IMAS) do not sufficiently prepare an operator for the dynamic situations they will face in the field. A unique set of standards must be developed for IEDD.

Local personnel hired to aid and (eventually) assume the responsibility of IEDD in a post-conflict area must be properly

vetted and cleared by the local government before receiving any IEDD training. The technical knowledge that is acquired through training is a restricted defense commodity, and it can be exploited to create IEDs. Proper vetting and monitoring of employees by the IEDD organization and open communication with the local authorities is vital to ensure that this technical knowledge is not given to insurgents.

**Risk Education.** The need and scope for risk education is evolving, and it is critical that it be delivered in an effective and controlled manner. With vast numbers of residential, commercial, and critical infrastructure buildings targeted by groups like ISIL, risk education needs to be immediate. Large numbers of displaced persons are waiting for the fighting to end before returning to their homes. Educating the returning populace to access their homes safely is required as searching and clearing every house in an affected area is impractical. However, this is not meant to replace IED search and clearance by the recognized organization. If IEDs are deemed highly likely or are confirmed, then the house, business, or area must be assigned by a coordinating body to an IEDD organization or local police with the capacity to implement SnD operations safely.

**Equip to Meet the Challenge.** At the conceptual level, IEDD operations employ similar equipment as conventional EOD operations. However, the equipment needed for IEDD operations is not only more advanced but can often be subject to export restrictions. Organizations must realize the limitations of equipment designed to combat different threats and must employ disruptors that can double as dearmers, hook and line kits that are fit for purpose, and personal protective



equipment (PPE) that is sufficient for the task. Seeking alternate equipment as a means of circumnavigating problems posed by acquiring controlled equipment is dangerously irresponsible. Without the proper equipment, the risk that operators face is greatly increased.

An equipment area that is in need of further detailed consideration in the future is the use of mechanical clearance to include tillers, flails, ploughs, and excavators. As with mechanical minefield clearance, these machines can be used to facilitate the rapid creation of a confirmed hazardous area, enabling the start of the search and clearance phase that will likely still need to be conducted. IEDs that were encountered in Iraq have typically had main charges with a net explosive weight (NEQ) ranging from 10 to 20 kg (22 to 44 lb). The damage that these charges would cause, even to armored and remotely operated machines, severely limits their effective use. Whereas the use of machinery has a place within IEDD, organizations need to carefully develop standard operating procedures (SOP) to utilize machines effectively.

### **CASE STUDY: RAMADI, IRAQ**

Janus commenced IEDD operations in Ramadi, Iraq, in April 2016. Janus first established an operations base and recruited local deminers to retrain as searchers. These personnel were trained in IED SnD as well as battlefield area clearance (BAC). International technical advisors with IEDD experience were employed to conduct training, mentoring, and operational EOD/IEDD tasks. The challenges initially faced by the project were similar to those often encountered by ERW eradication organizations in the post-conflict environment. These included the requirement to build relationships with local stakeholders and operating in an evolving situation with no clear tasking authority.

### **OPERATIONAL ASPECTS IN RAMADI**

**Explosive hazard threats from IEDs.** ISIL employed a wide range of both conventional ordnance and IEDs. Therefore, in addition to the requirement to clear significant quantities of Coalition and Iraqi Army UXO, the task of combatting ISIL's IEDs was immense in scale and filled with many uncertainties. The majority of the United Nations Development Program's initial priority tasks focused on searching and clearing critical infrastructure. Explosive hazards could range from a victim-operated crush-wire IED, to an improvised pipe bomb, to a conventional 81 mm mortar. In addition, large air-dropped munitions including numerous variants of 500 lb aircraft bombs were regularly encountered and posed a direct threat to the local population.

ISIL has also developed an extensive range of projected IEDs (from rockets and mortars to large improvised rocketed assisted mortars). A large portion of these are direct copies of conventional ordnance, incorporating cast-and-milled main bodies with homemade explosive fill and a detonating cord booster. The fuze is often an improvised copy of a military fuze, incorporating a plain detonator modified by the attachment of a percussion cartridge often taken from a 0.22 caliber cartridge. All of these improvised munitions need to be handled with care due to the unknown state of the explosive fill and functionality of any built-in safety features.

The wide range of explosive threats present in Ramadi reinforces the need for comprehensive training and operational approaches. Destruction of IED belts and pressure plates in situ is difficult due to the inability of acquiring adequate high order explosives. In Iraq, the only organization that can deliberately initiate a high order explosion is the Iraqi Army. This scarcity of high order explosives combined with the need to prevent further damage to Ramadi's critical infrastructure necessitates RSPs. Each RSP is different depending on how the device was emplaced and the individual situation that the operator encounters. It is critical to ensure that the Iraqis are trained for this task as local capacity is built. SnD is more complex than destroying IEDs in place in an open, permissive environment. They must master the concepts of IEDD.

### **FULL SND vs SURFACE BAC**

Prior to deployment, Janus developed a SnD training package based around the anticipated IED threat. Once deployed, these were further amended to take into account the significant number of non-pressure plate IEDs that were encountered, such as crush wire IEDs, trip wires, and anti-lift devices. Thus the courses developed for the students included basic explosive theory, device component parts, land service ammunition recognition, search equipment, procedures, and individual search drills. Additional training was also provided on BAC procedures, which proved to be a key element in increasing productivity when the threat of an active IED could be discounted.

Combined SnD and BAC training creates a higher level of productivity in many cases. In one case, a large water treatment plant was occupied and cleared by the Iraqi Army with workers returning and starting operations at the site. Non-technical surveys and some technical surveys were conducted in order to ensure that a surface BAC search could be safely conducted to locate conventional UXO and IED component parts. This adaptability in operations enabled a site to be

completed in approximately two days when full SnD might take two weeks.

### STOCKPILE CLEARANCE AND EXPLOSIVE HAZARD SPOT TASKS

After the Iraqi Army completed their ground assault of Ramadi they started the process of clearing the city of some of the IEDs left behind by ISIL. Often these were the devices that were placed in roads and the most significant buildings, therefore representing an immediate threat to military operations. These devices were then placed at the side of the road and formed uncontrolled stockpiles. These roadside stockpiles represented a significant explosive hazard. When the local population and construction workers returned to Ramadi without appropriate risk education, they started to add items to these piles. These items required detailed IEDD/EOD procedures to confirm that they were safe to move to a central demolition site (CDS) for final disposal.

The management of the deliberate clearance of the stockpile needed to be coordinated with a range of local and international stakeholders in order to achieve an adequate security cordon, evacuation of bystanders, and demolition. These stockpiles often represented an explosive hazard simply by the unstable nature of the homemade explosives and lack of basic explosive safety knowledge by the individuals that left the ordnance. For example, an electrical power source could be positioned adjacent to an electrical detonator that was still attached to a 20 kg (44 lb) IED main charge, which if it had functioned, could have detonated an additional 2,000 kg (4,400 lb) of explosives.


### LOOKING TOWARD THE FUTURE

The use of IEDs by ISIL is immense and has changed the face of what ERW response efforts will look like in the region for some time. This threat shares characteristics with other conflicts across the world including Afghanistan, Libya, Mali, Nigeria, Somalia, and Syria. Acceptance of sound IEDD principals is the cornerstone for organizations to develop effective programs.

The environments in which organizations operate are also likely to continue to become less defined with fluctuation in terms of stakeholders, armed groups, and the overall security situation. Groups such as ISIL are becoming more aware that after they leave an area, ERW organizations are deployed to clear explosive hazards. These organizations have become targets.

It is hard to quantify the lives saved and the utility provided by IEDD in square meters cleared or the number of devices

found. Educating the donor community about the highly specialized personnel and equipment required to meet this modern challenge effectively is an ongoing effort. We must accept the realities of limited funding yet still appreciate the critical importance that IEDD capacity brings immediately following a conflict. When the work and sacrifice of government militaries concludes, the private sector and humanitarian actors need to ensure that populations can safely re-inhabit liberated cities and towns. Employing specifically tailored approaches to the unique scourge of IEDs is fundamental to the ERW community and ultimately, the safety of civilians and operators alike.

The asymmetrical conflicts of the 21st century no longer resemble the battlefields of the past. When ongoing conflicts end, ERW organizations will be required to clear the path for civilians returning to their homes. In order for these post-conflict efforts to be successful, the ERW community must evolve to counter these threats. The IEDs that are left after the fighting ends in Iraq are testament to the modified tactics of the terrorist organizations. ERW organizations must adopt IEDD principles and practices in order for post-conflict recovery to occur. 

*See endnotes page 66*

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# Special Report: SOLOMON ISLANDS' EXPLOSIVE LEGACY

**T**he Solomon Islands encompass over 900 islands scattered across the ocean north of Australia and east of Papua New Guinea. Many of the 500,000 inhabitants still live with unknown quantities of explosive remnants of war (ERW) left behind from combat between Japan and the United States during World War II. Unexploded ordnance (UXO) of both U.S. and Japanese origin remains on some of the nation's atolls. Since the end of the war, sporadic clearance was undertaken, including through Operation Render Safe, a joint clearance program between Australia, Canada, New Zealand, the United Kingdom, and the United States. There have also been a number of commercial clearance projects. For the last five years, the international clearance organization Golden West Humanitarian Foundation (Golden West), supported by the U.S. Department of State, is working alongside the Royal Solomon Islands Police Force to address the problem on a more systemic scale. This operation focuses on heavily contaminated areas on the island of Guadalcanal.

BY METTE ELISEUSSEN AND JOHN RODSTED [ SAFEGROUND ]





Livingston is a constable with the Royal Solomon Islands Police Force on New Georgia Island. When he receives a report of old ammunition and bombs, he investigates. "I find many old bombs. The farmers and fishermen report them to the police. They in turn report to Honiara (capital of the Solomon Island). The problem is distance, logistics, time and money. The distances are great in the Solomon Islands and it takes time and money for the EOD team to be able to respond to all reports..."

*Photo courtesy of John Rodsted.*

### CONTAMINATION IN SOLOMON ISLANDS

On 22 January 1942, Japan dropped the first bombs on the Solomon Islands, and on 3 May of that same year, Japan occupied the country. Most foreigners were evacuated and those who remained took on roles as coast watchers with the Royal Australian Navy. With crucial help from the local population, they kept Australia informed of the Japanese movements. During the first

three months, Japan met no resistance and was able to construct an airfield on Guadalcanal. In response, U.S. Marines landed on Guadalcanal and Tulagi in an attempt to stop Japan from threatening their supply and communication lines to allies in the Pacific. The Solomon Islands campaign lasted over a year, killing over 24,000 Japanese and 1,600 U.S. soldiers.<sup>3</sup> In 1945,





Alec takes us for a walk into the mangroves and the Lever Plantation. This is where he hunts for bats and crabs. He always finds explosives and eagerly collects the small explosive pellets into a plastic bottle. His mother said as we left the village, "I am so scared when he leaves the village because I know he will find bombs. He always does. And how can I stop him from touching them when I am not with him?"

*Photo courtesy of Mette Eliseussen.*

foreign military forces left behind sunken ships, burnt-out tanks, abandoned stockpiles of weapons and ammunition, large empty gun emplacements, and UXO.<sup>4</sup> During the Solomon Islands' civil war, from 1998 to 2003, combatants made use of many abandoned weapons, which served as a ready source of deadly arms.<sup>5,6</sup> As a result of villagers becoming accustomed to handling explosives, it is believed that dynamite fishing increased during and after the conflict.

A significant factor hampering clearance efforts is the lack of reliable documentation of the WWII ERW contamination. The only sources of information recorded in writing are accounts from reports and books on battles written by the various WWII military forces fighting on the Solomon Islands from which it is difficult to pinpoint

ERW sites. Local islander knowledge is extensive albeit anecdotal, but not easily accessible to the national or international community.

#### INTERNATIONAL RESPONSE

Until recently, international awareness of ERW contamination and its impact in the Pacific was incomplete, even within the mine action community. This is partially because international assistance in mine action is primarily driven by two international treaties, the 1997 *Anti-Personnel Mine Ban Convention* (APMBC) and the 2008 *Convention on Cluster Munitions* (CCM). As neither landmines nor cluster munitions are believed to be present in the Pacific, donor countries and mine action operators prioritized

other regions, incorrectly assuming that the Pacific did not need humanitarian clearance and victim assistance. Hence the problem has persisted for more than 70 years since WWII ended.

In 2010, the first major change occurred when Pacific Forum Leaders tasked the Pacific Islands Forum Secretariat (PIFS) to assist in addressing the longstanding presence of ERW throughout the region. PIFS conducted a study of four affected countries in 2011 and found that ERW had the potential to impact local communities. Following this, the Pacific Forum leaders expressed concern and called for assistance to address the significant contamination from WWII UXO in the Pacific. For some member states, this contamination was identified as a human security problem threatening public health, safety, and the environment.

In response, the Forum Regional Security Committee endorsed a regional UXO strategy in 2012 to assist members with managing the negative impacts of WWII UXO. PIFS is now tasked to follow up with ERW-affected member states. The priorities are Kiribati, Papua New Guinea, the Royal Marshall Islands, the Solomon Islands, and Vanuatu. This selection is based on the following criteria: the lack of existing mine action in-country, the expressed interest and request for assistance, the level of contamination and its impact, and current bilateral arrangements with mine action operators.<sup>7</sup>

## INCIDENTS

There are no ERW-incident statistics in the Solomon Islands, as recording mechanisms are not in place. Because dealing with explosives is illegal, SafeGround, a nonprofit organization that works to help prevent and reduce the impacts of war and conflict, inferred that survivors and relatives of survivors tend not to reveal whether the reason behind an accident was caused by handling explosives. Hence, many incidents are likely to remain unreported. However, according to Doctor Rooney at the national reference hospital in the capital city of Honiara, the hospital usually deals with five to six patients injured by ERW each year. The actual number of injuries per year is estimated to be much higher than this.

As injuries are often fatal, many people never reach the national hospital but instead die shortly after the accident and are buried in their local community without casualty data being recorded. Infrequently, incidents are reported in the news, but this usually only happens if the explosion takes place near populated areas such as Honiara or

other regional centers. In 2010, the Royal Solomon Island Police Force estimated that an average of 15 Solomon Islanders lose their lives to ERW each year.<sup>8</sup>

Golden West has trained members of the Royal Solomon Islands Police Force in explosive ordnance disposal (EOD) methods. Golden West's project manager, Paul Eldred, reports extensive trespassing by bomb harvesters into ERW-contaminated areas at Hell's Point, which lies to the east of Honiara. On an almost daily basis, SafeGround researchers saw telltale signs of people searching and scratching the ground for larger munitions, leaving behind smaller, less valuable munitions. Fishermen or in some cases specialized bomb makers who harvest the bigger bombs for explosives are the culprits. Random digging patterns in the ground indicate that they may use metal detectors to find the bombs. Local residents who find bombs on their property will sometimes sell the ERW to bomb makers for a small finding fee.

Once the bomb makers extract the munitions, they cut the bombs in half with a hacksaw to expose the explosives within. Since many people who harvest ERW cannot correctly identify the different kinds of explosives, they may inadvertently open a phosphorous shell, which explodes on contact with the air. Harvesters place any explosives that are successfully extracted in 300 ml drinking bottles. Using homemade fuses, the harvesters produce **fish bombs** that can be thrown into the ocean to kill and maim large numbers of fish. It is a risky but profitable business. Although harvesting bombs is illegal, police are unable to take action without hard evidence.

For fishermen, homemade bombs are more efficient than nets or spears in terms of time spent and fish caught. However, using explosives is extremely risky and does extensive environmental damage. Fishermen using these bombs search for schools of fish and then gauge the depth at which the fish are swimming and how long to hold the bomb once lit before throwing it. When the fuse is ignited, it takes three to four seconds for the bomb to explode, but these are inexact estimations that can lead to disastrous results. Many accidents happen when bombs detonate too early, injuring or severing heads, hands, or arms. Detonations stun or kill the fish, but also destroy one of the Solomon Islands' most precious resources: the coral reefs, which are seriously damaged if the explosive detonates within a six- to eight-meter radius of the reefs. Once the bomb detonates, the fisherman jumps into the water with a





Frank is a fisherman on Ngella Islands who lost his lower arm when fishing with explosives.  
*Photo courtesy of John Rodsted.*

net to catch as many fish as possible. However, many more fish are killed than are caught and either drift away with the current or sink into deeper water. Once impacted by explosives, the reefs take a long time to regrow and often remain permanently damaged.

**Dynamite fishermen** run little risk of being caught by the police. In high-speed powerboats and with an arsenal of fish bombs, they do not meet much resistance from unarmed police officers equipped with fewer and slower boats.

#### ENVIRONMENT

Extensive dynamite fishing has devastated lagoons and in some areas, such as Langalanga Lagoon in Malaita, there are no reefs or fish left. Some local communities rate dynamite fishing as their top concern.<sup>9</sup>

These reefs provide the Solomon Islanders with fish to eat. Eighty-four percent of Solomon Islanders live in rural areas, and 95 percent of the rural population depends on subsistence farming and fishing.<sup>10</sup> Coral reefs cover less than one percent of the world's ocean floor and are one of the most biologically rich and economically valuable ecosystems. The Solomon Islands has diverse and interesting reef types, from narrow fringing reefs that border high island shorelines to rare, double barrier reefs, patch reefs, and atolls. The Solomon Islands has the second highest diversity of coral species in the world, currently home to over 494 coral species with several new species recently discovered.<sup>11,12,13</sup>

People in island communities relay that dynamite fishing is a common occurrence. Diving masters claim that they see up to 200 fishermen use explosives in waters



Local boys come across munitions left behind by bomb harvesters located in one of the hunting areas on Lever Point, Russell Island.

*Photo courtesy of Mette Eliseussen.*

around Ngella Islands every day. These fishermen boast about exceptional yields in just hours compared to the days needed to fill only one bin. Having sold the fish, they leave blasted reefs in their wake.

Reef growth rates vary from an estimated 0.8 to 80 mm per year depending on air and sea temperatures, wind speed and direction, salinity, tide levels, currents, availability of nutrients, algae, and the bottom surface. In the Solomon Islands, many people believe reefs may form in 20 to 40 years. However, the reality is that it can take much longer—even up to 10,000 years—for reefs to form from a group of larvae.<sup>14,15</sup> Reefs blasted by dynamite produce large amounts of rubble, creating terrible conditions for coral larvae which must attach to living reefs to start growing. Therefore reefs destroyed by bombing may not recover. In contrast, studies show that bleached reefs

can regrow in only a few years because the structure of the reef is still intact and coral larvae may again use it as a starting point for regeneration.<sup>16</sup>

#### ECONOMIC DEVELOPMENT

ERW contamination also affects economic development in the Solomon Islands. Honiara remains heavily contaminated and telecommunication, water, and electricity companies face grave challenges when digging trenches and postholes. Australian technical consultant Nik West expressed shock at the level of ERW contamination when he started working with the Solomon Islands Electricity Authority. He quickly realized that everyone in Honiara considered running a metal detector over the area before digging to be normal. “Much of our work is laying power lines for the national electricity grid. We are





Bombs and munitions may be found on the Solomon Islands anywhere there was fighting or military movement. Manny works as a timber cutter, farmer, and pig hunter. He relies on the forest and jungle for his livelihood. The mountains south of the Lunga River were occupied by the Japanese army to transport supplies before they pushed north to fight the Americans and Allied forces. Manny guided the Royal Solomon Islands Police Force EOD team to the munitions in the mountains. "When I work in these mountains I find many things; old munitions, crashed planes, guns, cannons, and equipment. The bombs and munitions scare me. If I hit one by accident or lit a fire and one was underground, then I would be killed. There was a bigger pile than this before. Maybe they have been stolen or thrown in the bushes, I do not know."

*Photo courtesy of John Rodsted.*

always digging the earth to erect power poles and trenches to lay cables. We often unearth old bombs, both large and small, in this work. This area surrounding Honiara was hit by everything during the war... The end result is there is a very large degree of ERW in this land. We are always using detectors, but despite that, this last week one of my staff hit a large bomb with a backhoe and unearthed it. The bomb did not explode, but it terrified the backhoe operator and he ran away home and is scared to come back to work."<sup>17</sup> When these workers find a bomb, they call the police, and members of the police's (EOD) team remove and dispose of the item.

Development projects are also struggling. Even in areas with less ERW contamination, construction

projects may stall. There are uncertainties with regards to safe practices and the need for clearance before construction can begin. The construction of a new campus for the University of the South Pacific, a US\$19 million dollar Asian Development Bank project, was delayed because of this issue. This highlights the need for national standards, which will create the base framework for the methodology and quality assurance needed to commence clearance in an effective and systematic way.

#### **CLEARANCE**

There are nine Pacific Island countries affected by ERW but clearance operations are only underway in Palau and the Solomon Islands. In the Solomon Islands,



Members of the Royal Solomon Islands Police Force EOD team prepare small munitions for an explosive demolition at Hell's Point. During the war, Hell's Point was a massive ammunitions storage area that caught fire. As the fire spread, soldiers evacuated and the area burned out of control for many days. Stored ammunition began to detonate, spreading munitions over a large area. The area was largely abandoned and the jungle finally took control. The area is very dangerous and the ground is not suitable for farming due to the contamination. Hell's Point is now home to the EOD team and school. Paul Eldred from Golden West Humanitarian Foundation says, "We have taken control of this area to try and secure it and keep the local people away from the dangers here. We have also set it up as our training facility and demolition range and we are systematically clearing the site of these munitions. The scale of the task is huge with an unknown amount of munitions spread over a very large area. It's not at all easy to deal with, but it is a great place to train. I am proud to say the EOD team members are some of the world's top professionals when it comes to dealing with World War II munitions."

*Photo courtesy of John Rodsted.*

Golden West's mandate is to function as a training, research, and development organization. They work closely with the Royal Solomon Islands Police Force and have trained an 18-man team in explosive ordnance detection and disposal. Their EOD experts respond to reports from the general public within the vicinity of Honiara, but they currently have neither the budget nor the mandate to achieve full clearance in the Solomon Islands.

The APMBC helped to bring the world together to clear the legacy of landmines and this effort has since expanded to include ERW as well. The Solomon Islands is a party to the APMBC, but they have yet to join the *Convention on Cluster Munitions* (CCM) and the U.N.

*Convention on Conventional Weapons* (CCW) where Protocol V covers ERW and is highly relevant. However in April 2016, Minister Salato from the Solomon Islands Geneva mission participated, along with Australia and SafeGround, on an expert panel on ERW contamination in the Solomon Islands during a Protocol V expert meeting in Geneva.

There is hope that the donor community and mine action operators will increase their assistance to help the Solomon Islands combat its ERW contamination in the near future. In 2014 and 2015, with the support of Australian Aid and Pacific Islands Forum Secretariat, SafeGround conducted field research in the Solomon Islands. For over three months, staff spent time in





Members of the Royal Solomon Island Police Force EOD Team clear away the last of the 69 mortars that were reported on Hill 31 behind Honiara. Willy Basi, the local villager who notified the police of the munitions, said “I am very happy to see the bombs taken away. They are very dangerous for everyone, especially the children.”

*Photo courtesy of John Rodsted.*

Guadalcanal, Ngella Islands, Russel Islands, and New Georgia Islands, working closely with the Ministry of Police National Security and Correctional Services, Royal Solomon Islands Police Force, Golden West, and PIFS as well as a number of local island community

members. The main results of this collaboration are a report, a documentary film, and a photographic exhibition available at: [www.safeground.org.au/project/solomon-islands](http://www.safeground.org.au/project/solomon-islands). ©

*See endnotes page 66*

#### **Mette Eliseussen**

Project Manager  
Safeground



Mette Eliseussen has worked in war-torn and developing countries since 1989. She worked for many years with Save the Children in Afghanistan where she developed and ran child-specific mine risk awareness. She is the co-founder of the Afghan Campaign to Ban Landmines. More recently, she has undertaken extensive research projects on communities at risk of ERW in northeast Cambodia and the Solomon Islands.

#### **John Rodsted**

Photojournalist



John Rodsted is an Australian photo-journalist who covers conflict and post-conflict issues. Since 1986 he has worked in some of the world's more challenging environments including Afghanistan, Bosnia and Herzegovina, East Timor, Eritrea, Kosovo, Lebanon, and Sudan.



*in the SPOTLIGHT*

**LIBYA**



# Working from a Distance in War-Affected Libya

by Nikolaj Søndergaard [ DanChurchAid ]



Assessment in 2011.  
Photo courtesy of Marcus Q. Rhinelanders.

**A** unique partnership between DanChurchAid (DCA) and Lebanese authorities facilitates explosive ordnance disposal (EOD) training for Libyan authorities, who can now start their own national EOD teams and begin the clearance process.

Cluster bombs, rockets, grenades—virtually every form of bomb and type of ammunition—are scattered over large parts of Libya. Unexploded ammunition is killing children and adults; however, the Libyan authorities lack the capacity to clear these explosives, and the continued instability makes

it impossible for international demining organizations to conduct clearance.

With funding from the European Union, DCA is collaborating with Lebanese and Libyan authorities to fly relevant Libyan officials to Lebanon, where they are receiving EOD training in Arabic. Maria Berwald Madsen, program manager for DCA Libya describes the program: “We have worked closely with the authorities in Lebanon for many years clearing landmines and cluster munitions there, so it was natural to collaborate with them when we needed a place to build the capacity of the Libyan authorities.”

On 20 March 2016, 11 Libyans received EOD level 1 and level 2 training in Lebanon, funded by the European Union. The 11 participants were from the Libyan Mine Action Centre (LibMAC), the Libyan National Security Agency (NSA), police forensic officers, and army engineering corps.

## Successful Partnerships

DCA worked with a wide range of local partners in Libya, ranging from the Libyan army to small, self-started organizations. In May 2011, it began operations in Libya, just three months after the start of the revolution. When DCA munitions experts crossed the border between Egypt and Libya, they assessed the situation and started clearance activities. In the following years, this first tentative effort developed into a large country program with headquarters in Tripoli and local employees from many parts of Libya.

Regarding DCA’s work, Maria Berwald Madsen said, “Initially, we focused only on clearance activities led by our own people and with local deminers that we trained ourselves. However, we expanded to also work with psychosocial support mainly for children, capacity building of local authorities, armed violence reduction and a number of other initiatives.” In the summer of 2014, renewed fighting meant that DCA had to evacuate all international staff to Tunisia, where the program is managed. Luckily, DCA was already working through local partner organizations, and this approach has since been extended.



EOD course in Lebanon, April 2016.  
*Photo courtesy of Tobias Selsnæs Markussen.*



ACT Alliance team helps Libyans deal with unexploded ordnance.  
Photo courtesy of Paul Jeffrey.







DCA teaches basic first aid in Libya.  
Photo courtesy of DCA.

DCA's 16 local partner organizations conduct active citizenship, risk education, and psychosocial support as well as armed violence reduction activities. These organizations work directly with local DCA employees, while the overall management remains in Tunisia.

In discussing the many benefits of working through partners, Maria Berwald Madsen says, "We want them to take charge of their development in the creation of safer and more resilient communities. They are the ones that are a part of the community, they are the ones that know what the needs are on the ground and how to respond to those needs."

There are often challenges to working with new local organizations; many of them lack experience performing the work

and running an organization. However, the benefits outweigh the drawbacks as local citizens have a reach within their communities that international organizations lack.

### From Libya to Lebanon

One of DCA Libya's main objectives is to improve the safety of the Libyan people by clearing unexploded ordnance (UXO); however, this is a difficult task to complete from Tunis. When international ammunition experts could no longer enter the country due to the conflict and were unable to oversee clearance operations on-site or train local authorities in clearance tasks, DCA was forced to move these activities outside Libya. Most courses in Tunisia involve basic clearance and



Photos this page: A quiz competition between students in Libyan schools is meant to attract young people to school work and provide a break from thoughts of war.

*Photos courtesy of Tobias Selsnæs Markussen.*





Libyan children are offered toys donated by LEGO in return for their toy weapons.  
*Photo courtesy of Tobias Selsnæs Markussen.*



Workshops in Libyan schools use creative activities as a way for children to process their trauma.  
*Photo courtesy of DCA.*





On Mine Awareness Day in Libya, piles of toy weapons were traded in for LEGOs as part of a program to educate children on the dangers of weapons.

*Photo courtesy of Tobias Selsnæs Markussen.*

safety training. High level EOD courses cannot take place in Tunisia, partly because DCA lacks sufficient registration in the country and partly because of Tunisia's insufficient facilities and equipment.

Charmen Rahal, the planning and security manager for DCA Libya, proposed that the Libyan deminers fly to Lebanon and conduct training there in cooperation with the Lebanese security authorities. Rahal has a background with the Lebanese Mine Action Center (LMAC) and was the operations manager for DCA Lebanon. Rahal noted, "The Lebanese military have extensive experience in clearing bombs after the conflicts with Israel. They work with clearing this stuff every day, so I knew they would be able to conduct the training at a really high level."

DCA annually conducts EOD level 3 courses in Skive, Denmark, in cooperation with the Danish engineering regiment, who provides equipment, facilities, and instructors. Luckily, the Lebanese authorities agreed to do the same. In addition to being closer to Libya, there were a number of other advantages to conducting a course in Lebanon (e.g., the common language).

"We are dealing with bombs and explosives, so it's important that the students understand absolutely everything that the instructor says. The course would not have worked as well, if we had for example completed the course in Denmark," explains Rahal, adding that none of the 11 Libyan students on the course knew any English.

However, there are quite a few differences in dialect for Libyan Arabic and Lebanese Arabic. Moreover, the field of EOD is characterized by many English phrases that cannot be directly translated into Arabic. Therefore, language was still a challenge during implementation of the program.

Another challenge encountered during implementation was the high level of training required. Participants were not used to intensive training and needed to study from morning to night six days a week while learning a significant amount of new material. This meant that three of the 11 participants failed the level 1 course and had to return to Libya before the level 2 course began on 17 April 2016. Eight participants succeeded in completing the level 2 course and graduated on 18 May 2016.



A large sign campaigning for a reduction in armed violence hangs on the side of a damaged building in Libya. The campaign was funded by DCA to inform Libyans on the dangers of weapons.

*Photo courtesy of Tobias Selsnæs Markussen.*

The eight participants who passed are scheduled to attend an EOD level 3 course in Kosovo, where instructors from DCA and Danish Demining Group (DDG) will conduct the training. Rahal predicts that all of the eight new Libyan EOD experts can make a tangible difference to the Libyan people.

While eight new EOD experts may not sound like much, “each of these participants can go back to Libya and manage a team of deminers,” says Rahal. “Today there are many ERW in ... Benghazi, but also around Misrata and Tripoli, resulting in many accidents. These people can go back and work directly on the ground removing UXO, which we will follow through our national staff in Libya. It will save lives. And we must do more similar training in the future.”

When asked why he wants the dangerous job of clearing bombs and ammunition, Mouez Miftah, one of the students completing the course responded, “Because I need to help the people. It is my country.” ©

**Nikolaj Søndergaard**  
Communication Officer  
DanChurchAid



Nikolaj Søndergaard is a Danish journalist and worked for various media before he came to DCA in 2013. Since then, he has worked as a communication officer with responsibility for covering DCA's mine action activities.



# Explosive Remnants of War Contamination Response in Libya

by Damir Djakovic and Katarina Cviki Balić [ ITF Enhancing Human Security ]



Figure 1. Map of Libya.  
Figure courtesy of CISR.

**A**bu Grain is a town located 106 km (66 mi) east of Misrata and 138 km (86 mi) west of Sirte with an estimated population of 2,000 inhabitants. The town is known for its strategic road intersection connecting the Mediterranean cities of Misrata and Sirte with the desert district of Jufra. Between February and March 2016, Abu Grain's population fled as Islamic State (IS) group forces advanced into town in an attempt to expand control toward the west of its stronghold in Sirte. According to the Libyan Red Crescent, Abu Grain's inhabitants mostly fled to Bani Walid, Misrata, and Tripoli.

While in control of Abu Grain, IS forces began to advance further west in the beginning of May 2016. However, they were stopped by Al Bunyan Al Marsous (ABAM) forces shortly thereafter at Sidada Bridge, only 6 km (4 mi) outside of Abu

Grain, and open conflict ensued. After five days of clashes, ABAM regained control of Abu Grain on 11 May 2016, slowly pushing IS fighters back toward Sirte until mid-June 2016, when ABAM entered the city.

Immediately after the conflict in Sirte, the Libyan Mine Action Center (LibMAC) sent a two-member team from the LibMAC Risk Education (RE) division to Abu Grain to research explosive remnants of war (ERW) contamination in the area. The team assessed potential risks posed by ERW to the local population who were expected to return to the village from internally displaced persons (IDP) camps. During a two-week period, LibMAC personnel collected information on the present population numbers and whereabouts as well as on the destruction in Abu Grain and contamination

from landmines, improvised explosive devices (IED), and ERW. They were joined by LibMAC's quality-assurance officer, allowing the team to compose dozens of non-technical



Area of Abu Grain in close proximity to the strategic intersection, May 2016.  
All photos courtesy of LibMAC.





Training delivered by LibMAC RE section staff in Tawarga IDP Camp in Tripoli, Libya (February 2016).

surveys and hazard area information reports by mid-June. Reports were delivered to the Information Management System Mine Action database officer in LibMAC and are being processed further before being utilized as the foundation for future mine action operations.

Given the results of the initial assessment in Abu Grain—as well as data of widespread use of landmines, ERW, and significant IED contamination in many parts of Libya—prevention of further devastation caused by explosive weapons will need to become the focus of mine action in much of the country. Explosive weapons are often used in cities, towns, and villages from which civilians fled but will likely return.

In the case of Abu Grain, it is believed a large majority of the population returned to the town by the end of July 2016. In order to help the returnees in recognizing the threats present in their hometown, and to prevent significant loss of life and additional damage to homes and infrastructure, LibMAC launched a non-technical survey campaign in August 2016.

LibMAC's RE division carried out urgent RE campaigns previously at the IDP Tawarga Camp in February 2016. Although LibMAC's staff does not normally implement RE campaigns, there are possibilities for them to deliver in

situations where no other Libyan implementing partner is present or available in the area. The RE campaign in Tawarga IDP Camp, delivered by five LibMAC representatives, trained 25 IDPs who serve as focal points and will share the information they learn with their camp in Tripoli. An ITF Enhancing Human Security RE technical adviser supported and oversaw the campaign and training sessions. The ITF technical adviser developed strategic RE plans and carried out RE capacity building within LibMAC by implementing intensive on-the-job training.

Since 2014, the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA) has supported capacity-building activities of the ITF technical adviser and of other ITF operations in Libya. Initially, ITF provided administrative and financial support to LibMAC and capacity building for the operations section, implemented through the employment of an explosive ordnance disposal (EOD) technical adviser.

Like other Libyan implementing partners, ITF's international personnel withdrew from Tripoli in mid-2014 due to security concerns over anticipated armed conflict between various militias in the city. During this period of time, no

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LibMAC  
The Libyan Mine Action Centre

Risk education materials recently developed for use in August 2016 in Abu Grain, Benghazi, and Sirte, Libya.



organization other than Libyan military engineers had access to perform clearance or battle area clearance (BAC) in the country. Since 2014, program operations are facilitated remotely with the ITF administrative coordinator and RE technical adviser on the ground in Tripoli.

Despite the extremely volatile situation, ITF ensures LibMAC receives technical support. Field conditions in Libya and the absence of international partners led those currently in Libya to devote more attention to remote training, ensuring that LibMAC personnel (especially in Tunis) build much-needed local expertise. Similarly, with hostilities continuing and clearance operations unable to continue, the focus shifted to helping local populations learn about the risks associated with ERW.

The RE technical adviser deployed in November 2015, which led to significant progress in LibMAC's RE operations. Under the supervision and guidance of the technical adviser, a number of relevant supporting documents and strategic plans were developed, including necessary standard operating procedures for effective RE campaigning.



Risk education materials recently developed for use in August 2016 in Abu Grain, Benghazi, and Sirte, Libya.





LibMAC RE section chief during training sessions in Tawarga IDP camp in Tripoli, Libya (February 2016).

With very solid groundwork laid by the RE technical adviser, ITF envisions additional, stronger support for RE activities. Conscious of the risks posed by ERW in Libya, prioritizing education will involve providing more comprehensive, long-term, and geographically widespread support for RE activities. Based on the assessment of LibMAC's needs and in consultations with PM/WRA as the donor, ITF proposes to support LibMAC's RE section to minimize the deadly impact

of mines, ERW, and IEDs as much as possible while strengthening LibMAC's operations division, as the national focal point for all operations must not be neglected. Nevertheless, much of the planning will largely depend on the security situation in the field and the possibilities for geographical expansion of LibMAC and its overall access in Libya. ©

#### **Damir Djakovic**

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Damir Djakovic is a humanitarian mine action professional with more than 15 years of experience working on U.S. government and U.N. projects in Afghanistan, Armenia, Iraq, Libya, and Sudan. He joined ITF in January 2014 and serves as ITF project officer in Libya.

Previously, Djakovic worked as business manager and technical adviser in Sterling International Group, DynCorp International, and RONCO Consulting Corporation. He holds a master's degree in chemical engineering from the Military Technical Academy of Yugoslav Army.

#### **Katarina Cvikić Balić**

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Katarina Cvikić Balić joined ITF in 2015 after working as a policy researcher for a nonprofit in Bosnia and Herzegovina, focusing on the country's post-conflict reconstruction. Balić holds a Master of Arts in international development from the University of Manchester and a Bachelor of Arts in international relations from the University of Ljubljana.

## Field Notes

# Effectiveness and Impact of UNDP Mine Action Support: Lessons Learned

by Charles Downs [ Consultant ] and Alan Fox [ UNDP Independent Evaluation Office ]

The United Nations Development Programme (UNDP) has supported mine action in more than 40 countries since its first involvement in Cambodia in 1992. UNDP support generally focuses on the development of national mine action management capacities. In early 2016, the Independent Evaluation Office (IEO) of UNDP concluded the first global evaluation of the results of UNDP support in mine action, with particular attention to its effectiveness and impact.<sup>1</sup> The evaluation reviewed documentation relating to all national, UNDP-supported mine action programs, in-depth desk reviews of support to 14 countries, and background for field case studies of three national programs (Laos, Mozambique, and Tajikistan). It also included visits to two dozen communities in Laos (n=8), Mozambique (n=11), and Tajikistan (n=5)—all of which were previously mine-affected and where demining had occurred at least five years before the evaluation visit. The evaluation highlighted several important lessons regarding effectiveness of international support in mine action and provided important nuances to the discussion of impact in mine action. UNDP management accepted the recommendations addressed to it.<sup>2</sup>

## Origin and Development of UNDP Mine Action Support

Modern mine action began with the U.N. decision in late 1988 to train and equip Afghans living in refugee settlements in Pakistan to return to their country to clear landmines. In 1989, a U.N. coordination office was established to oversee the process, with national nongovernmental organizations (NGO) as the main operators; The HALO Trust was established as the first mine action international NGO (INGO). In 2002, the Afghanistan program was transferred to the United Nations Mine Action Service (UNMAS) for implementation by the United Nations Office for Project Services (UNOPS). Globally, the next mine action programs were established in

Kuwait (1991) for clearance after the First Gulf War and in Central America (1992) for clearance of minefields resulting from internal conflicts. The former was conducted on a commercial basis and financed by the Kuwait government, and the Organization of American States in cooperation with national armed forces supported the latter. UNDP was not involved with any of these mine action programs.

Initial UNDP involvement in mine action was a corollary of U.N. peacekeeping missions during the first half of the 1990s (Cambodia, 1992; Mozambique, 1993; Angola, 1994). In these cases, peacekeeping missions were contracted for demining services (i.e., road access, resettlement areas, etc.) and to train local personnel as deminers. These missions did not have a mechanism to continue financing or employing trained teams beyond the life of the mission, and looked to UNDP to recruit deminers and channel funding. In each country, UNDP established specific projects and organizations for this purpose—managed by UNOPS, which has continued to implement those projects for UNDP since 1995. UNDP gained further experience on a country-by-country basis in Laos (1995), as well as with the peacekeeping missions for Bosnia and Herzegovina and Croatia in the mid-1990s. On the groundwork of an important multicountry study in 1997, the maturing international mine action community concluded that the national mine action center should not be an operator to minimize the labor and budgetary implications—as well as potential conflicts of interest in allocation of funds—and to insulate the national (or international) authority from liabilities.<sup>3</sup> Other major NGOs that would have a global role in mine action joined The HALO Trust in the early 1990s: MAG (Mines Advisory Group), Handicap International (HI), and Norwegian People's Aid (NPA).

International civil society's reaction to the lasting effects of landmine contamination in the aforementioned countries led to the 1997 adoption of the *Anti-Personnel Mine Ban*



Community maps in Mozambique showing contamination drawn by women.  
Photo courtesy of UNDP/Rebecca Roberts.

Convention (APMBC), transforming international mine action. First, it established an obligation for each mine-affected State Party to remove all known minefields from its territory, as well as a provision that each State Party in a position to do so would provide assistance for such efforts. Although the implication was not immediately clear to all, this implied a long-term effort to clear every mine rather than simply make each country safe. Second, the United Nations, NGOs, and commercial demining firms understood that international mine action would continue for many years, and that they should organize themselves accordingly. UNMAS and the dedicated mine action units of UNDP, UNOPS, and UNICEF were established during this period, as was the Geneva International Centre for Humanitarian Demining (GICHD). The International Mine Action Standards (IMAS), the dedicated Information Management System for Mine Action (IMSMA), and the institutional model of separating the national mine action entity for operational management from that of policy,

as well as separating both from field operations, are all from this period. During the first years of the APMBC until the First Review Conference in 2004, most countries with historic mine problems established national UNDP-supported programs with the exception of those coming out of immediate conflicts, which more often had UNMAS-managed programs.

Initially it was expected that UNMAS would have operational responsibility for peacekeeping mine action programs, which UNOPS would implement to provide continuity, then hand over to UNDP as each program's mission ended. This changed for several reasons:

1. There were delays in UNDP picking up some national programs.
2. UNMAS staff believed they were more effective at responding to mine problems than UNDP or national bureaucracies.
3. UNMAS involvement typically was accompanied by much greater donor resources than those UNDP could attract.





Community maps in Mozambique showing contamination drawn by men.  
 Photo courtesy of UNDP/Rebecca Roberts.

An effective UNMAS program during this period was in Kosovo (1999–2001), in which the U.N. Mine Action Coordination Center coordinated the technical response and resources to largely resolve the mine problem without the national government. The international staff of UNDP mine action support projects sometimes had to unlearn lessons from Kosovo in order to become mine action advisers rather than mine action managers to focus on developing national capacities to manage the respective mine action program.

### *National Ownership*

Distinguishing the development of national ownership from the development of technical management capacity is important. UNDP has generally been successful in supporting institutionalization of national ownership—which is more comprehensive than developing national technical capacity—and projects staffed and managed by nationals. National ownership is a question of government commitment rather than

of staff passports. The evaluation identified a few essential aspects of national ownership:

- \* Formal establishment of the national mine action entity
- \* Inclusion of the national mine action entity in the regular government budget
- \* Inclusion of mine action in the national recovery and development plan
- \* Adherence to key relevant treaties (e.g., APMBC)

UNDP is particularly capable of developing a formal, institutional framework for mine action. Institutional support and capacity building are aspects of most mine action support programs and are commonly carried out by GICHD, UNDP, United Nations Children's Fund (UNICEF), UNMAS, bilateral donors, and also NGOs in some cases. However, in peacekeeping contexts, the presence of UNMAS is generally due to a breakdown in government capacity, and it acts in substitution of government with that role somewhat begrudgingly accepted. Governments do not change institutional structures to fit

1988-1997		1998-2004		2005-present	
UN-Managed	UNDP	UN-Managed	UNDP	UN-Managed	UNDP
Afghanistan Angola Bosnia Croatia Mozambique Northern Iraq	Angola Bosnia Cambodia Lao PDR Mozambique	Burundi Cyprus DR Congo Iraq Kosovo Lebanon Sudan UNMEE W. Sahara	Afghanistan Albania (Armenia) Azerbaijan Bosnia Chad Colombia Croatia Eritrea Ethiopia Guinea-Bissau (Iran) Iraq Jordan Lebanon Mauritania Senegal Somalia Sri Lanka Tajikistan Thailand (Ukraine) Yemen	CAR Chad Colombia Cote d'Ivoire Darfur Liberia Libya Mali Nepal OPT Somalia South Sudan	Algeria Burundi (Cyprus) (Egypt) (Liberia) (Libya) (Malawi) (Pakistan) (Rep. of Congo) (Sudan) (Uganda) Vietnam (Zambia) (Zimbabwe)
Note: (Country) = Limited UNDP Support					

Table 1. Initiation of UN-managed and UNDP-supported mine action programs.  
Figure courtesy of the authors.

the needs of a peacekeeping mission, which is generally considered to be an infringement of national sovereignty.

UNDP has not been universally successful in developing government ownership. In some cases—including Laos, Mozambique, and Tajikistan—the national mine action entity continued for more than a decade as a UNDP project without proper institutionalization or inclusion in the national budget. Although conducted in agreement between the government, UNDP, and some donors, such situations delayed essential actions for long-term sustainability and created donor doubt regarding national commitment.

### *Support and Development of National Mine Action Management Capacity*

Based on lessons learned in the late 1990s, the evaluation team identified the key management capacities that the national mine action center requires as information management, strategic planning, quality management of operations, and resource mobilization. Expertise in each area can be developed through specific training and experience. However, trained personnel may not remain in the national entity once the international project ends.

UNDP's comparative advantage in institutional development is seen by many as not carrying over to the technical side of demining. Close working partners supplied much of the specific technical support provided under the UNDP umbrella. In the early years of UNDP mine action, UNOPS supported the implementation services and developed rosters of experts and suppliers. One or more NGOs or specialized firms then provided operational support for demining. GICHD supports operational policy development in many countries, and its advisers continue providing mine action expertise to governments supported by UNDP. The ad hoc relationship with GICHD has been particularly valuable, whereby GICHD provides technical expertise and relies on UNDP for country-level access, support, and coordinated follow-up.

### *Information Management*

Quality of data and reporting is vital to the credibility of the national mine action program. All mine action programs and operators endeavor to maintain good records of the demining work conducted and areas of suspected contamination. In the past, personnel used a simple spreadsheet or database, but complexity grew as the amount of data increased with

surveys of suspected hazardous areas (SHA), as well as with the introduction of GIS and mapping capabilities. Database and mapping tools developed during the 1990s due to the need to record the entirety of the landmine problem and the detail of site-specific operational work—with GICHD establishing the IMSMA for UNMAS. In many cases, IMSMA was installed in parallel with conducting a Landmine Impact Survey (LIS), although some existing programs were reluctant to replace their own database systems with IMSMA.<sup>4</sup> GICHD provided the IMSMA software and training free of charge to mine action programs. As efforts were made to improve technical skills, IMSMA was used as the basis for strategic planning in response to the overall mine and explosive remnants of war (ERW) problem.

Development of information-management systems within government structures has been an especially difficult capacity-development challenge in many countries due to the difficulty of retaining qualified staff. The data quality and management of the system improved over time but was frequently interrupted by the loss of qualified personnel to better paying, private-sector career opportunities. These positions often received salary top-ups, and new technical personnel required fresh training on a continual basis. GICHD primarily provided technical support, with donor financing through UNDP. A continued need for technical and financial support for information management is likely, even with a well-established national mine action management entity. This is a long-term global challenge to maintain the specialized capacity required for mine action centers.

Lastly, in many programs when information-management systems were upgraded or a new baseline survey was conducted, previous data sets were set aside. For example, the 2015 mine action database in Mozambique goes back to 2008, missing the information for demining conducted during the first 15 years of the national program. This greatly reduces its usefulness for long-term development and land-use planning, for which it would be valuable as a georeferenced data set similar to ones for hazardous waste and other environmental contamination, flood plains, and earthquake hazards.

### *Strategic Planning and Prioritization*

The global mine action community recognizes the value of strategic planning as an essential element of effective national mine action programs. Previously, programs with annual operational plans began to develop strategies that assessed the known extent of the problem, considered the level of operational activities necessary to resolve it, and projected the

financial resources required to complete the task on time. The first plans were often produced with considerable input by international advisers, and in many cases, funded through UNDP. Over time, with more experience and better information, later strategic plans were more realistic and included wider national and local participation. The process of preparing APMBC Article 5 extension requests has been an important impetus to strengthen the quality and realism of national mine action plans.

Prioritization of land clearance tasks was a vital component of strategic planning. During the initial periods of peacekeeping and humanitarian emergency programs, high-priority tasks were easy to discern, and less emphasis was placed on assessing the relative importance of second-tier sites for clearance. Once emergency tasks were resolved, a large number of competing priorities with which to contend remained, bringing increased importance to prioritization. However, there was little practical guidance:

- ✱ The APMBC set clearance deadlines but provided no prioritization.
- ✱ UNMAS published a suggested set of general priorities in 1998 that included emergency assistance; settled land with high civilian casualties; land required for resettlement of IDPs and refugees; land required for agriculture; community development; access to free operation of health services; and reconstruction and infrastructure.<sup>5</sup>
- ✱ Demining operators sought to maximize the efficiency of their teams and equipment, and prioritized factors such as physical and seasonal access as well as suitability of minefields for available demining assets (climate, vegetation, topography, and nature of the landmine/ERW contamination). For operators, safety and ease of use took precedence over the impact on beneficiary use of the land.

### *Landmine Impact Surveys and Evidence-based Priority Setting*

The introduction of LIS in the late 1990s was a deliberate effort to shift the practice of setting priorities based on minefield characteristics and operator capabilities to focusing on communities with socioeconomic problems caused by suspected mined areas. UNDP (together with UNMAS, UNOPS, and the Survey Working Group) was an early promoter of LIS as a means to obtain more complete information, not only of suspected mined areas, but also of their socioeconomic impacts on affected communities. LIS was carried out in heavily



A woman cultivates vegetables for consumption and market under Pylon 183.  
*Photo courtesy of UNDP/Rebecca Roberts.*





mine-affected countries between 1999 and 2006. LIS and other impact-assessment tools were introduced to ensure that assets would have the greatest positive result for mine-affected communities. LIS increased the socioeconomic benefit of demining by focusing greater demining resources on resolution of community problems. This was done at the expense of reducing its operational efficiency by increasing the estimated size of SHAs for demining and increasing the frequency with which demining teams moved to address higher impact areas. While UNDP focused particular attention to higher socioeconomic impact areas, national governments sought demining support for infrastructure, regardless of the level of existing local socioeconomic impact.

Experience has confirmed the merits of a two-tier approach to priority-setting for demining, with national prioritization at the broad category level of blocked resources (roads, markets, water ways, farmland), coupled with the selection of specific tasks based on local needs. UNDP-supported planning processes have in some cases overemphasized local priorities, with insufficient hazard evidence. To avoid this risk, the first operational response should be precise surveying rather than clearance. As evidence-based approaches to priority setting were applied in different countries, they resulted in increased numbers of mines removed per hectare cleared and a reduction in the percentage of tasks where no mines were found. This approach was advocated for some years by GICHD, UNDP, UNMAS, UNOPS, NGOs, and with the support of donors. Over time, most programs developed a combined methodology for priority setting—partly impact, partly technical, and partly prioritization by local authorities.

### *National Mine Action Standards and Quality Management*

National mine action standards (NMAS) form a critical part of the quality-management process, together with the operator-accreditation process, and the verification of cleared land. In countries where it has helped establish mine action programs, UNDP has supported the issuance of NMAS to guide the management and implementation process. In most countries the first NMAS were developed by an international technical adviser, who essentially adapted the IMAS (since 2001) or other existing mine action program standards (before 2001) to the country in question. The resulting first standards were nearly always in English. Over time NMAS were revised and translated into national languages. Some revisions consider national experience, although changes to global IMAS continue to drive most countries' revisions.

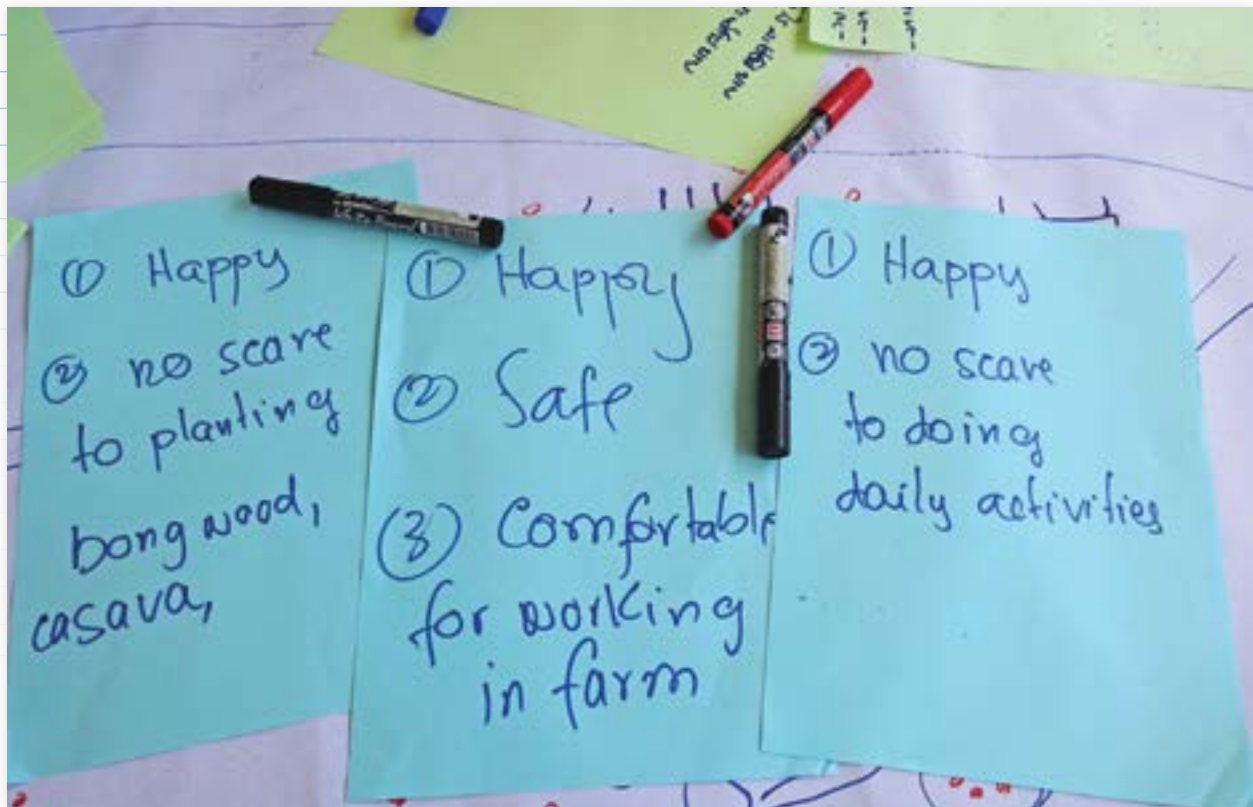
### *UNDP Support of and Impact on Mine Action*

During the evaluation-inception phase, the team identified possible impacts from demining on local communities: improvements in household income resulting from the ability to use previously contaminated land; reduction in time required to travel to markets and service centers due to use of more direct routes; and a reduced number of new mine victims. Given UNDP's focus on marginalized populations, the team also sought to determine whether the benefits of demining were being captured by elites, for example with displacement of poorer populations that previously had accepted risk and farmed or lived in hazardous areas.

The evaluation team identified these possible impacts, recognizing the gap between UNDP **upstream** activities and actual demining carried out by operators. UNDP support is usually several steps removed from direct impact on communities and can be considered effective to the extent its actions result in greater government focus, rule-setting, and management capacity. Respectively, these can positively affect the laws and procedures set in place for demining, prioritization of areas for demining, and quality of demining results. Indeed, UNDP mine action support activities have many positive results: development of national statutes and demining strategies; trained deminers; stronger quality assurance; improved information management and greater understanding of the landmine problem; more effective use of resources; less time spent on clearance of areas without mines; greater total areas cleared, etc. These are important results, yet the evaluation deliberately focused on **downstream** changes in the living conditions of the beneficiary population, and the team endeavored to find links between UNDP mine action work and perceived benefits to local communities.

Across the 24 communities visited in Laos, Mozambique, and Tajikistan, and based on evidence from interviews, focus group discussions, and documentary evidence, the main (perceived) problems caused by mine/ERW contamination from the perspective of community members and local officials were

- ✱ The proximity of land contaminated with mines and ERW caused fear. People worried about themselves, their families (particularly children), livestock, and friends.
- ✱ Contamination interfered with freedom of movement, as mined roads affected the delivery of assistance and transport of goods, and contamination prevented children from going to school on their own.



Outcomes of the focus group discussion with beneficiaries on the impact of clearance, Asingtai (New) Village, Samouy District, Saravan Province, Laos.  
Photo courtesy of UNDP/Paul Davis.

- ✱ Contamination restricted access to natural resources, impeding the collection of firewood, mushrooms, medicinal herbs, grass to make hay for animals in the winter, and water for drinking and irrigation.
- ✱ Fear, restricted movement, and restricted access all led to reduced economic opportunity and well-being—especially for mine victims—with significant long-term repercussions, such as increased vulnerability and poverty for those affected.

The principal impact on the community came from the broader sense of safety and ability to move freely throughout the area. When questioned about what had changed as a result of demining activity, local residents indicated they felt more secure and could “walk without fear.” In virtually all of the communities visited, the inhabitants (male and female) reported significant safety improvements following clearance.

While community members believed that socioeconomic conditions at the community level had improved, the extent was highly variable and difficult to quantify. In most villages visited, evidence indicated improved living standards as a result of the mine action effort. Community members expressed that they could resume their normal daily activities

unimpeded, farming larger plots of land or existing plots more efficiently. Farmers, who previously worked contaminated fields cautiously, were able to dig deeper with their equipment and move faster across their land, accessing water and other resources more easily. The observed economic improvements were primarily due to personal initiative rather than specific economic development or job-creation assistance from the government, the U.N. or NGOs to promote development following clearance.

Most community members who were interviewed reported that besides immediate medical attention, no support was provided for mine survivors and their families. Community members stated that in the absence of victim support, the socioeconomic conditions of mine survivors were consistently worse than they had been prior to the mine/ERW accident.

The evaluation did not find evidence that the release of previously contaminated land was a significant source of conflict. Although cleared land was generally put to use, it was not a new resource available for use by new claimants. In the countries visited, the families who traditionally used the land were known and continued to use the land before and after clearance. Where this was not the case, there was an established



procedure to allocate new land, which was applied to cleared land. Short of a land-reform process, the evidence suggests that clearance in these countries has not created a new asset to be distributed at the will of the government (or of any international actor). Although respondents in all three of the countries visited were aware of disputes over land, none of them reported that these disputes were related to cleared land.

### Conclusion

The transition to national ownership of mine action in some countries aided by UNDP has been slow and inconsistent, and the sustainability of some nationally managed programs remains in question. In two of the three case countries, the national mine action entity remained UNDP projects until recently, despite decades of UNDP capacity-building support.

UNDP has sought to mainstream gender in its mine action programming, particularly through calling attention to the U.N. Gender Guidelines for Mine Action and seeking support of the Gender and Mine Action Program hosted by GICHD. Basic integration of gender in mine action is widely accepted (e.g., surveys of women as well as men for information on suspected areas; relevance of sex disaggregated data on mine victims). Nonetheless, little evidence shows that UNDP support in this area has transformed national mine action programs, and further efforts to improve gender equity are required.

The livelihood improvements evident after demining in the observed communities stemmed mostly from local initiatives, enabled by reduced risk and improved access or by specific programs sponsored by UNDP and national government partners. As mine action programs mature, they tend to become increasingly focused on poor rural communities confronted by a wide array of development challenges. Economic development and job-creation programs would benefit from including the requirements of such mine affected communities. ©

See endnotes page 67

*The authors were the senior consultant and the IEO team leader for the evaluation. The evaluation team included additional consultants for general support (Dilnoor Panjwani of IEO) and for individual case studies (Jo Durham, Paul Davies, Rebecca Roberts, and Anna Roughley). The views expressed in this article are those of the authors, not necessarily those of IEO or any other team member.*

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Charles Downs has worked in international development for more than 30 years and was chief of the Mine Action Unit of the United Nations Office for Project Services from 1999 to 2004. His consulting work seeks to increase the effectiveness of mine action and its impact on local and national development. Recent consulting and training promote results-focused design and monitoring for improved management and greater program effectiveness. Downs is also a professor of international project management at the NYU Wagner School of Public Service.

### Alan Fox

Evaluation Advisor  
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Alan Fox is an evaluation adviser for the Independent Evaluation Office of UNDP, based at the UNDP headquarters in New York since 2009. Fox is responsible for leading thematic and country-level evaluations, including recent assessments of UNDP support to countries on mine action and UNDP support to conflict-affected countries in the context of U.N. peace operations. Fox began his government career in 1984, serving as executive assistant to the Mayor of Cleveland, Ohio, and then as associate assistant administrator for water at the U.S. Environmental Protection Agency. Prior to joining UNDP, Fox served as vice president for consulting in the infrastructure division of the international engineering and consulting company Pöyry PLC (Finland). His portfolio of project management and evaluation assignments spans 50 countries.

## Field Notes

# Emerging Patterns of ERW Injuries in Laos

by Stacey Pizzino [ University of Queensland ], Colette McInerney [ World Education Laos ],  
and Jo Durham, Ph.D. [ University of Queensland ]

The year 2016 marks the beginning of a new era for international development, with the adoption of seventeen Sustainable Development Goals (SDG) that will drive global development efforts until 2030. In post-conflict countries, humanitarian mine action will be an important enabler in achieving a number of SDGs, including goal 3: “ensure healthy lives and promote well-being for all at all ages.” Of particular relevance is target 3.9 of the SDGs, which specifies the need to reduce the number of deaths and illnesses from soil pollution and contamination.<sup>1</sup> At present this relates primarily to indoor and outdoor air pollution. However, since explosive remnants of war (ERW) contamination can be directly attributed to a significant number of deaths and injuries in post-conflict countries, the inclusion of ERW is relevant. Demonstrating mine action’s contribution to target 3.9 requires accurate, reliable, and readily available ERW injury data, which will also allow for the appropriate allocation of resources to both ERW injury prevention and adequate access to emergency medical and rehabilitation services. As progress on goal 3 will be reported on through the health sector, SDGs provide an opportunity for mine action injury databases to link with national health information systems based on standardized, minimum reporting requirements for injuries using international standards, statistical principles, and global measurement methods.

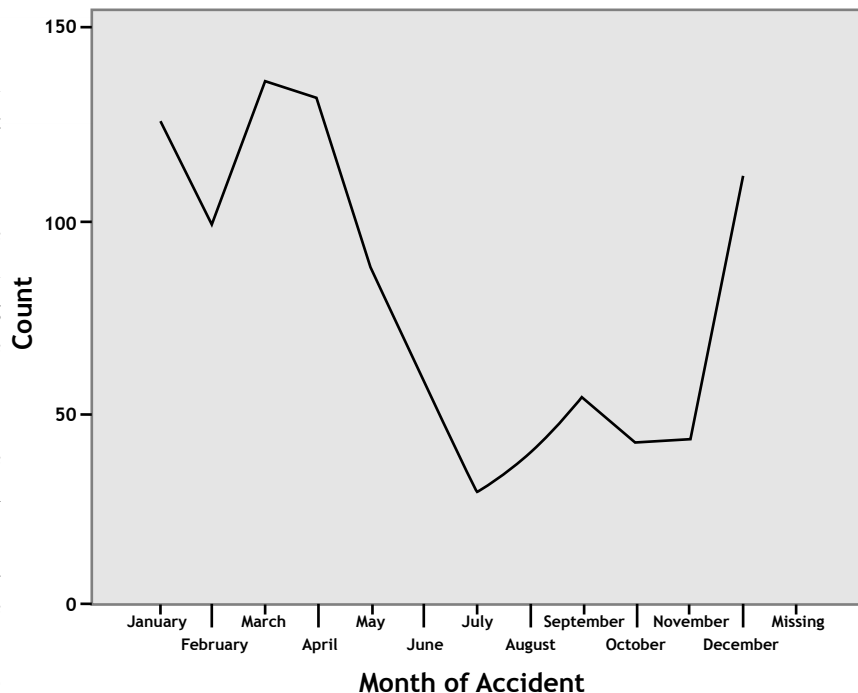


Figure 1. Month of accident.

All graphics courtesy of authors.

Laos is the most heavily bombed country in the world per capita, contending with extensive unexploded ordnance (UXO) contamination resulting from a heavy campaign of cluster munition bombings during the second Indo-China War.<sup>2</sup> World Education, a nonprofit organization operating in Laos since 1992, works in nine of the most heavily contaminated provinces, particularly Xieng Khouang Province in northern Laos, to reduce the socioeconomic impact of ERW. Recognizing the need to enhance its analysis and use of ERW-injury data, World Education Laos recently undertook an

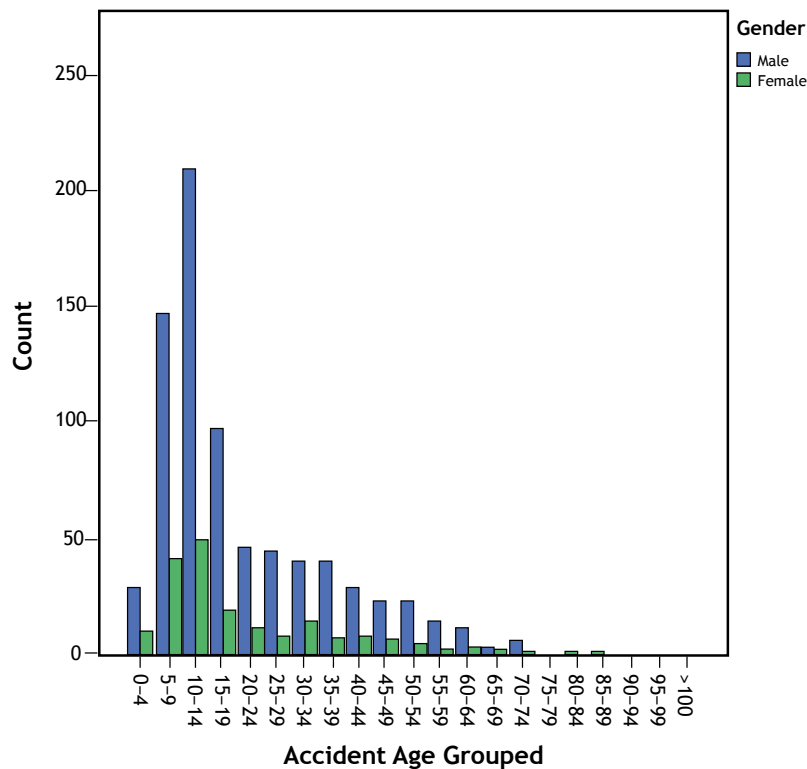


Figure 2. Age at time of accident.

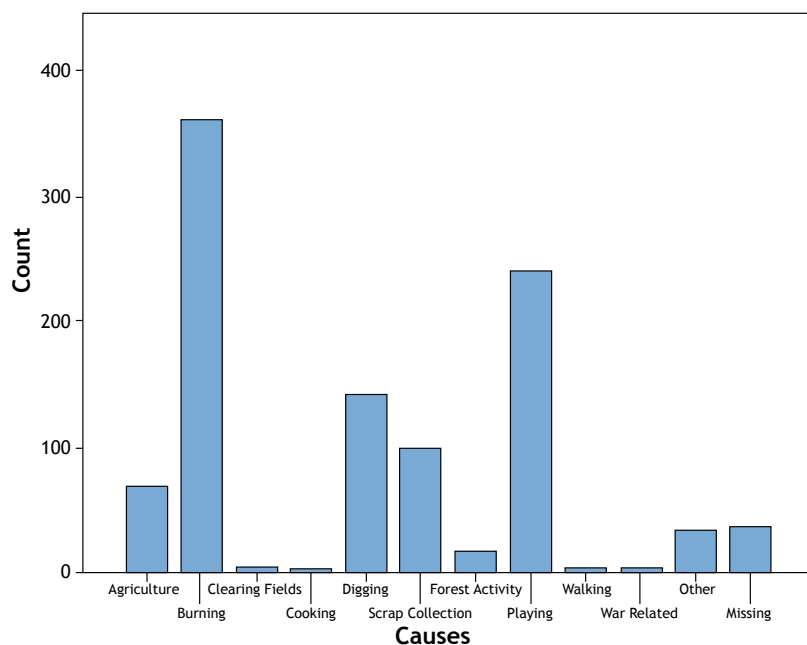


Figure 3. Causes of UXO injuries.

analysis of its ERW database and identified gaps for improvement.

World Education Laos and the Laos provincial Departments of Health co-implement the War Victims Medical Fund (WVMF) project, which supports the cost of complex treatments for ERW casualties. This article presents the demographic and epidemiological patterns of ERW injuries in the WVMF project database and provides recommendations, which although specific to World Education's victims database, are pertinent for other organizations' work in the victims' assistance sector. These recommendations analyze the demographics of ERW victims in Laos and target responses to their needs.

As part of the project, World Education maintains an Excel database that extracts patient data from the medical registries of ERW patients. For this study, researchers processed the data for analysis by first identifying missing data, translating, and coding qualitative variables (i.e., variables including: short explanation of cause of injury, diagnosis/injuries, and disabilities) from Lao to English, and giving each patient a unique identification code. The data from the Excel database was then imported into the Statistical Package for the Social Science version 22 (SPSS) and statistical analyses were conducted. Notably, while World Education's database provides a rich source of information, the findings of this study cannot be generalized beyond the areas in which World Education provides assistance to UXO survivors. Additionally, the data was only obtained from medical facilities and may exclude patients who died before reaching care, whose injuries were too minor to seek medical care, or who used health services outside of World Education's area of work.



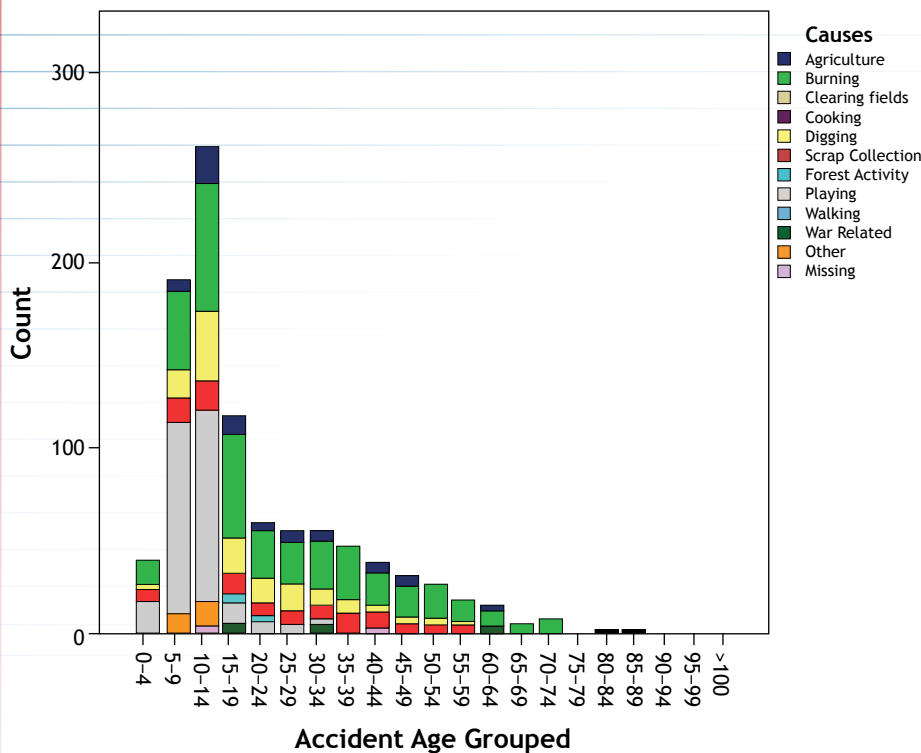


Figure 4. Causes of injury by age group.

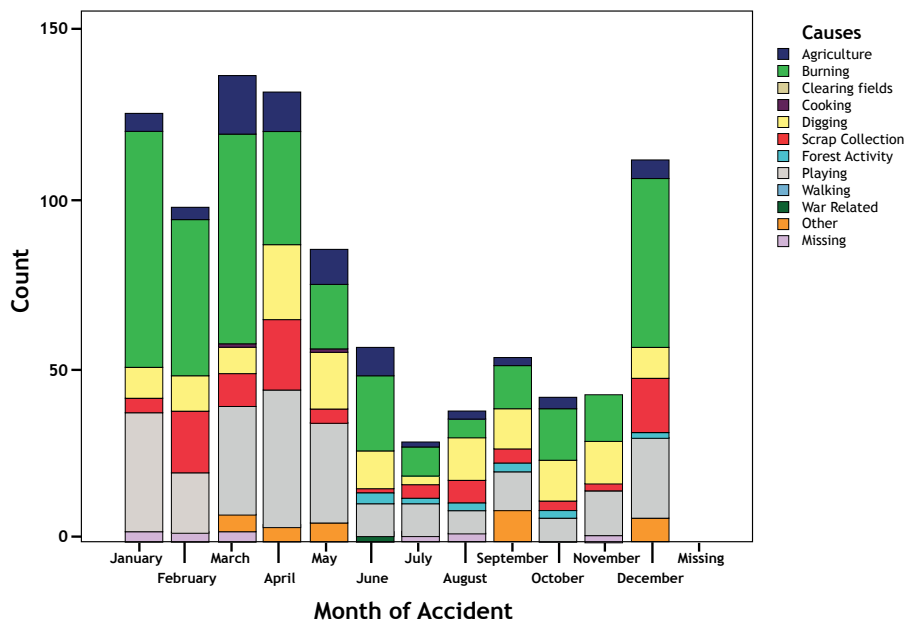


Figure 5. Causes of injury by month.

## Results

World Education has operated in Laos since 1992. Collection began in 1996 when World Education commenced working with UXO survivors in Laos. The analysis included data from 1996 through March 2015. The database contained information on 1,013 UXO survivors from 12 different Lao provinces. Most of the survivors were from Xieng Khouang Province (N=706). Of the 307 survivors originating from the 11 other provinces within the dataset (i.e., the northern provinces of Houaphan, Luang Prabang, Vientiane, and Xaisomboun; and the southern provinces of Attapeu, Bolikhamxay, Champasak, Khammoune, Saravane, Savannakhet, and Sekong), most originated from Savannakhet Province (N=142).

Of all the UXO survivors included in the database, most UXO injuries occurred between December and April, and resulted from burning fires to cook or keep warm in the colder months or from slash and burn agricultural practices. The least number of injuries were observed in July (Figure 1, page 54).

**Age and Survival.** Most of the injured persons were male (79.3 percent) with 45.2 percent 15 years old or younger (Figure 2, page 55). These findings are similar to those reported in the 2008 National Regulatory Authority of Lao PDR study and those conducted elsewhere (e.g., Afghanistan, Chechnya).<sup>3,4,5</sup> Although exposure to and injury from UXO may be less frequent for females, the 15-years-or-younger-age group is still at an increased risk of injury, with the distribution of injuries across the lifespan highest for females in this age group.

The young adult and mature-age group (i.e., males and females over 15 years old) represents the largest percentage of survivors. This age group is

particularly important as these years are potentially the most economically productive. Injuries and any consequent disabilities may have substantial negative impact on social and economic factors for the individual, family, and community.

**Causes of Injury.** As shown in Figure 3 (page 55), primary causes of UXO injury within the World Education database include burning (35.7 percent), playing (23.9 percent), digging (14.2 percent), and indirect injury associated with scrap collection (9.7 percent).

Burning accounted for 354 injuries, occurring more frequently between the months of December through April (Figure 5, page 56). Coinciding with cooler periods of the year when people light fires to keep warm, this period is also the typical season for agricultural burning. Playing as a cause of injury (N=239) occurred across the year, regardless of season, predominately in children younger than 15 years old. Digging (N=137), which may be reflected in activities related to agriculture and digging in the surrounding fields, had the greatest impact on those between five and 29 years old, while five-to-19-year-olds were the age group most vulnerable to injury as bystanders during scrap collection (N=95). Injuries directly related to agriculture (N=66) were most prominent in the 10-to-19-year-age group.

## Discussion

Data collection, analysis, and reporting are fundamental to ensure accountable, efficient, and targeted programs that comprehensively meet the beneficiaries' needs. The WVMF UXO survivor data provides a baseline for demographic and population health patterns within the operational provinces of World Education Laos, and establishes a context to improve the accuracy of health information at the organizational level. While the data findings cannot be generalized to the broader population, the patterns of injuries parallel findings from the National Regulatory Authority of the Lao PDR study. These findings also mirror those of other regions and conflicts (e.g., Afghanistan, Chechnya), indicating a reasonable level of confidence in the credibility of the data.<sup>3,4</sup>

Future collection, analysis, and dissemination of health data relevant to mine action are required to meet the objectives of the SDGs and the obligations of signatories of the *Convention on Cluster Munitions* (i.e., Article 5), which calls for accurate data collection to assist victims.<sup>5</sup> The most cost-effective method to increase health data accuracy and meet SDG obligations would involve integration with other injury surveillance systems. As momentum builds within the international development community to meet the agenda of the

SDGs, injury surveillance systems will likely be strengthened to meet specific injury-related goals (e.g., road traffic accidents). This provides mine action players with the opportunity to standardize surveillance methods that can be linked to other injury surveillance systems. As the lead United Nations agency for mine action, the United Nations Mine Action Service (UNMAS) within the United Nations Development Programme (UNDP) should use this opportunity to enhance collaboration with other U.N. agencies such as the World Health Organization (WHO) to support countries reporting against SDG 3, leveraging these opportunities to ensure appropriate recognition of mine action's contribution to SDG 3.9. This is important in both demonstrating the contribution of ERW injuries to the overall injury burden both globally and within individual countries, and in allowing the appropriate allocation of resources to ERW injury prevention, treatment, and rehabilitation. Finally, longitudinal studies are needed to fully understand the impact of ERW injuries. ©

See endnotes page 67

### Stacey Pizzino



Stacey Pizzino recently completed a Master of International Public Health at the University of Queensland with her dissertation evaluating the epidemiological patterns of explosive remnants of war. Her research involved field work in Laos with both government and nongovernmental organizations. Pizzino has a Bachelor of Health Science from Queensland University of Technology and has worked as a paramedic in Australia.

### Colette McInerney



Colette McInerney has a Bachelor of Arts in community development from Monash University and has over 35 years of experience in community development specializing in microfinance, economic empowerment, and sustainable livelihoods across Australia and various countries in the Asia Pacific region.

### Jo Durham, Ph.D.



Jo Durham has a long-standing interest in mine action including mine risk education, victim assistance, and finding information that will improve access to appropriate healthcare services for populations. She currently lectures at the University of Queensland in health and development and health aspects of disasters.

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# R&D

## Research and Development

**The Research and Development section is funded by the  
U.S. Department of Defense,  
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# maXML: COORDINATING MINE ACTION WITH XML TECHNOLOGIES

by Dionysia Kontotasiou and Olivier Cottray [ Geneva International Centre for Humanitarian Demining ]

The Mine Action XML (maXML) is an Extensible Markup Language (XML) schema developed by the Geneva International Centre for Humanitarian Demining (GICHD). It aims to standardize data management and data exchange among actors in the mine action community, which includes individuals and groups involved in any aspect of addressing the landmine and explosive remnants of war (ERW) contamination. In this field, data exchange is mostly manual and often has to deal with chaotic environments. The goal of maXML is to contribute to the automatization of many of these processes, saving valuable time for staff in the field and improving the information flow for decision makers who have to allocate resources for land clearance activities. The maXML vocabulary provides a formal definition of the terminology used in this domain and an initial set of tools and services that produce and consume maXML data.

Provided by the GICHD as an information management system, the maXML schema was originally created in 2002 by identifying data that members of the mine action community were interested in sharing. This was done through interviews and by reviewing various mine action information systems, standards, and processes. Since then, maXML has been further developed by adding vocabulary that reflects the developments of the data in the Information Management System for Mine Action (IMSMA). The rationale behind the exchange format was to allow each organization to retain their established data management practices but still facilitate data sharing with GICHD and other collaborators. The problem maXML addresses is facilitating data exchange between humanitarian actors in a way so that (a) data can be accessed in a standardized way, (b) standardized terminology and identifiers for commonly used entities can be defined, and (c) the use of those identifiers is supported at the time of reporting.

## RELATED WORK

Data exchange between different actors has been a challenge both for GICHD and the humanitarian field as a whole. GICHD and other organizations tried to address different aspects of this

problem by developing multiple data collection and management systems. Over the past few years, several different standards for data exchange in the humanitarian domain were developed.

The **Humanitarian Exchange Language** (HXL) tries to collate data regarding humanitarian needs and response activities conducted by a large number of humanitarian actors. HXL, inspired by social-media hashtags, is a simple standard that adds hashtags to spreadsheet headers to make it easier to share and compare humanitarian data.<sup>1</sup> maXML is a completely different approach since it converts user-entered data to XML structures and then shares them (by exporting/importing functionalities) with other compatible systems.

The **Emergency Data Exchange Language** (EDXL) is a collection of XML-based messaging standards initiated by the U.S. Department of Homeland Security and developed by the Organization for the Advancement of Structured Information Standards (OASIS).<sup>2</sup> EDXL consists of different components that specify how to exchange data about distributions, resources, hospital availability, situation reporting, and tracking of emergency patients. As the name suggests, EDXL was designed to speed up the direct communication between the different actors in an immediate emergency (e.g., when an ambulance quickly needs to find a hospital nearby that can accept a patient). maXML, in contrast, focuses on standardizing and streamlining data reporting in long-term humanitarian operations. It provides a method to track information such as affected population, education provided, quality management (QM), clearance activities, etc.

The **International Aid Transparency Initiative** (IATI) is an effort that targets the transparency of development aid spending.<sup>3</sup> It consists of an XML schema for describing an organization involved in any stage development cooperation (funding, implementing, etc.) and an XML schema for describing the details of individual development cooperation activities and projects. maXML goes beyond organizations and activities and focuses also on affected populations and victims, education and victim assistance provided, land clearance activities performed, etc.

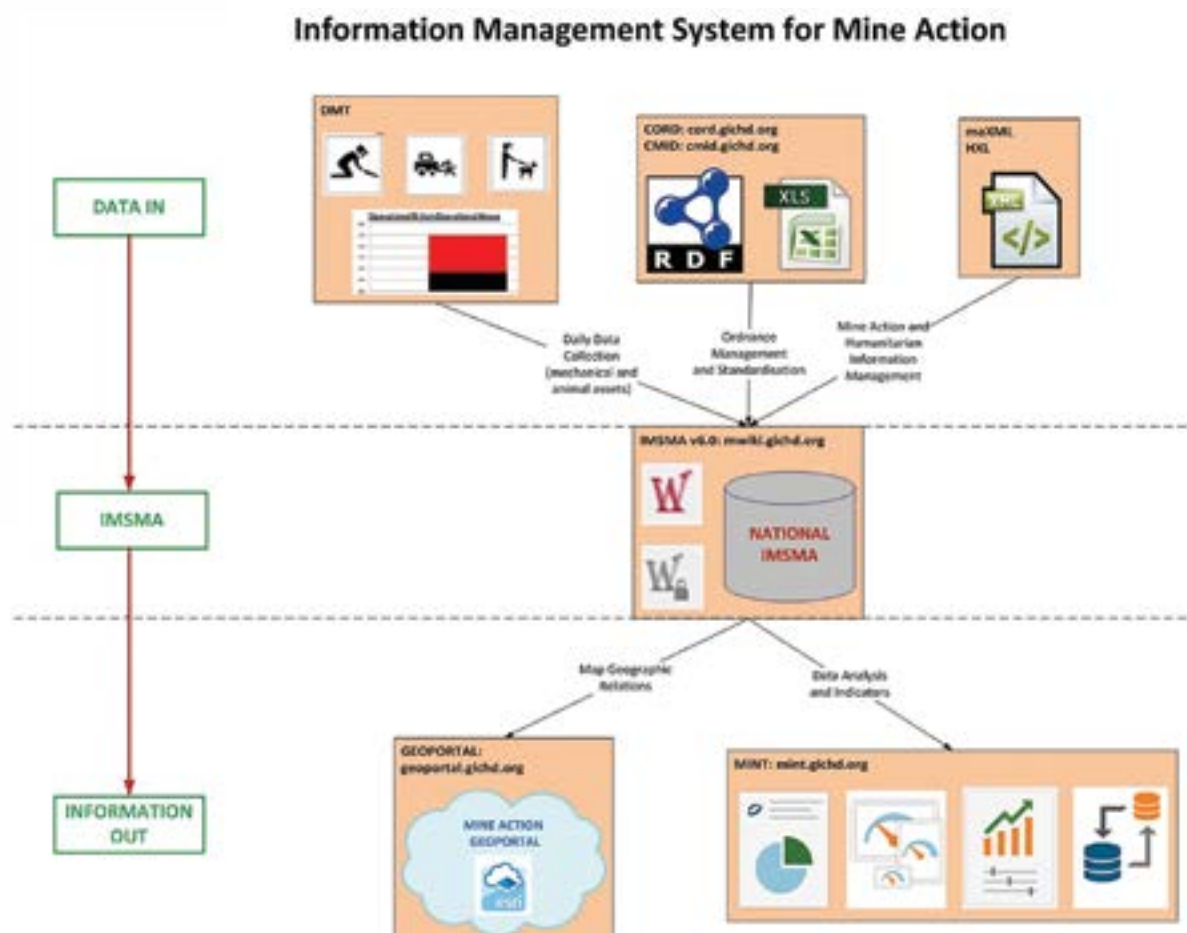


Figure 1. IMSMA Architecture.  
All graphics courtesy of GICHD.

The **Geography Markup Language** (GML) is a version of XML that handles geographic features and enables open format communication of geographic data. In 2006, the Croatian Mine Action Center (CROMAC) coordinated with Geofoto LLC to develop a geoinformation system used for a digital visualization and analysis of geographic features and events.<sup>4</sup> maXML is a broader XML schema since it provides additional information on top of the geo data.

The **Ushahidi Platform** uses the Management Of A Crisis (MOAC) vocabulary and collects and visualizes information while enabling interactive mapping.<sup>5,6</sup> It allows individuals to share their stories on their own terms, using the tools they already have. Instead of being a story-telling platform, maXML followed another direction and is considered an XML schema to share and exchange data in mine action.

#### DATA EXCHANGE IN THE MINE ACTION ECOSYSTEM

Mine action is inherently geographic, and activities are usually associated to geographic areas undergoing a series of other

activities, all of which aim to release previously hazardous areas for productive use. Related mine action processes that require data collection and management include non-technical survey, technical survey, clearance, collecting casualty data, and mine risk education (MRE).

Within countries, these activities are usually carried out by different organizations reporting to a national mine action center (NMAC) or other national authority. This induces a data flow from several different actors into a central entity. The NMAC is an organization that, on behalf of the National Mine Action Authority (NMAA), is responsible for the planning, coordination, overseeing, and implementation of mine action projects. For national mine action programs, the NMAC acts as the operational office of the NMAA.

IMSMA is traditionally deployed and used at the NMAC or NMAA level. The information gathered during mine action operations is reported by the implementing organizations to the NMAC. Typically, data is sent in any format (e.g., paper, spreadsheet, or via

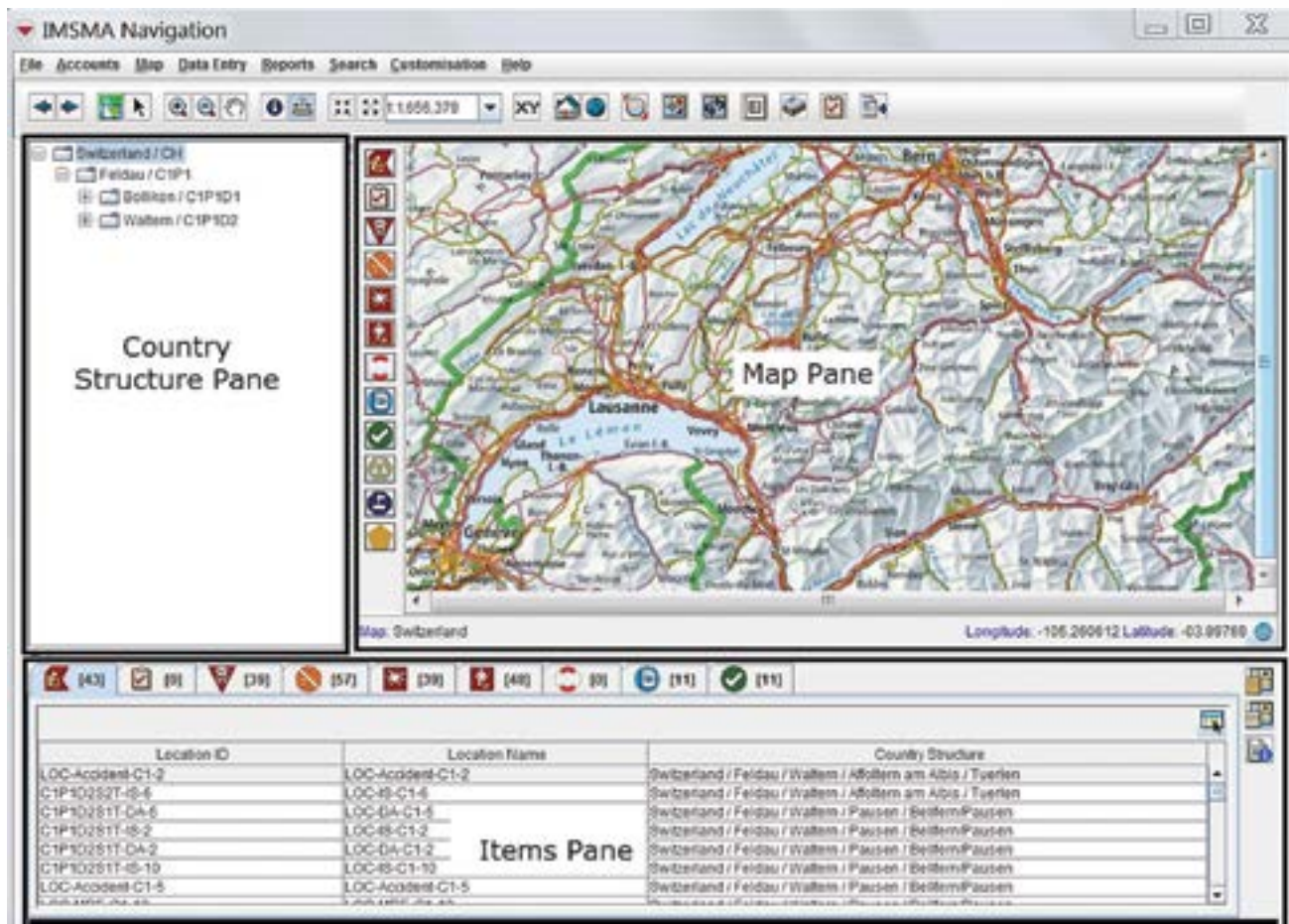


Figure 2. IMSMA graphical user interface.

digital mobile data collection tools) to the NMAC, where the data is entered into IMSMA. Alternatively, the implementing organizations have access to IMSMA and enter information that can be imported into the NMAC's system.

#### REQUIREMENTS SPECIFICATION

The primary requirement for maXML is that it addresses the fundamental information management problem described previously: maXML must make the compilation of a common operational picture more efficient. The identification of this problem comes from the experiences of information managers who have worked in multiple MACs over the last several years.

In solving this fundamental problem, proposed solutions must not significantly increase the reporting burden already imposed on humanitarian actors. Ideally, solutions should reduce burdens by only requiring that organizations report data once and in a way that serves the diversity of users, from operational partners to analysts at the global level. To be successful, solutions should not

replace existing information management systems but rather focus on interoperability between existing systems. A standard way of describing and encoding operational humanitarian data can achieve this interoperability; however, a standard alone is not adequate to solve the problem.

#### PROPOSED SOLUTION

After analyzing these requirements, a solution based on XML was identified as the most promising. An XML vocabulary for the domain provides a sound definition of the most important domain concepts. The first step towards maXML was the definition of the vocabulary, which is described in the following section.

#### maXML VOCABULARY

Developed to annotate humanitarian data, the maXML schema syntax conforms to the World Wide Web Consortium (W3C) Recommendation (October 6, 2000) for XML 1.0. The current version of the vocabulary focuses on quantitative information



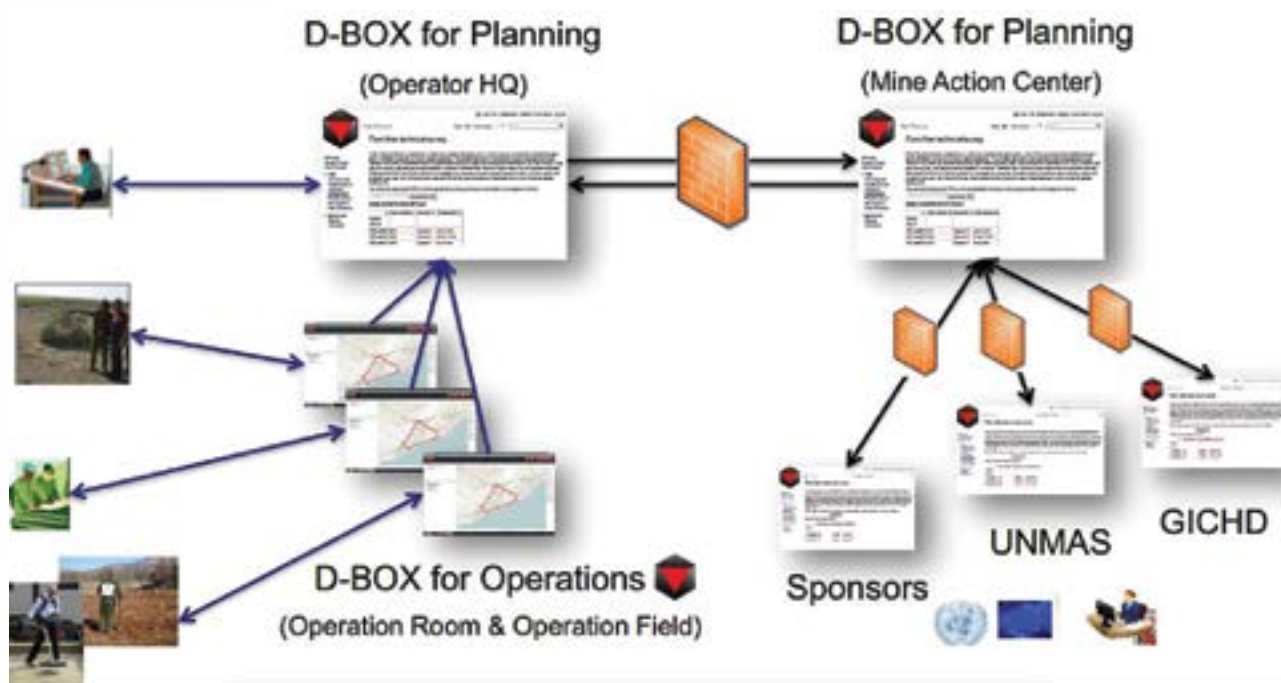


Figure 3. D-BOX: Interoperability with maXML.

that can be directly used to generate reports, maps, and interactive dashboards. The main sections of the vocabulary are presented by topic:

**Geolocation.** Provides the elements to annotate geographic information. It builds on the Open Geospatial Consortium's (OGC) Simple Features model and extends it. This approach ensures that all maXML data is fully compliant with OGC and hence support complex spatial queries in a standardized way.

**Activity.** Conveys information pertaining to the technical survey activity, the area in which the activity was conducted, the result of the activity (data collected as part of a technical survey), and other relevant information.

**Victim Assistance.** Defines the elements required to publish data about the populations affected by landmines and the assistance received by different organizations. The elements in this section correspond to the humanitarian profile, breaking down the person by the way in which the corresponding populations are affected (victim, direct beneficiaries, victim assistance, etc.). In addition, the various organizations involved in assistance activities—including name, abbreviation, and internal ID—are defined here.

**Education and Quality Management.** Contains the elements to describe the MRE and QM involved in land release activities.

**Ordinance.** Describes hazardous devices, their characteristics and technical details such as effect, case color, case material, detectability, diameter, dimension, explosive component weight, fuze method, transportation, etc. The main source is the Collaborative ORDnance Data Repository (CORD).<sup>7</sup>

## DESIGN PRINCIPLES

Reusing existing vocabularies is a central principle to ensure interoperability. However, in the context of maXML, special care is taken to ensure that any existing vocabularies still used by actors are stable and that the definitions of concepts correspond exactly to those used in the mine action context. These points constrained the number of potential vocabularies to reuse considerably. An element such as country could be taken from existing vocabularies. However, when maXML is specified, no definition that includes nations along with dependent territories was found.

From a technical perspective, the vocabulary is divided into thematic sections as introduced in the previous subsection. This makes the vocabulary more tractable and allows for the automatic generation of a well-structured documentation for the vocabulary.

## DEVELOPMENT PROCESS

In recent years, IMSMA expanded and evolved in order to meet the requirements of international humanitarian standards and the general developments of mine action. This process progressed quickly so the definition of maXML specifications and their documentation has lagged behind. As a result, maXML became an internal protocol rather than a well-known one.

Since the expansion and evolution trend is expected to continue, the GICHD decided to review the current maXML situation and determine the future sustainability of the protocol.

The updated protocol should be capable of

- coping with current expansion of IMSMA
- coping with future expansion of IMSMA in relation to

**Area information** Hazard reduction activity - 2015-03-19 21:09:44

**Details**

Area name	Demo-1	WGS 84
Area officer	Paul Jones	Lat
Area supervisor	Tom Wilson	Long
Area type	Forest	Name
Assumption	Possibly Affected	Description
Community leader	Deborah Duncan	RP Demo-1
Dangerous area type	Suspected minefield	Wide of road
Distance to nearest town	4 km	
Municipality	Scenepace	
Marking methods	Local Signs	

Figure 4. T-IMS: Exporting maXML data.

international humanitarian law such as the *Anti-Personnel Mine Ban Convention* (APMBC), *Convention on Cluster Munitions* (CCM), *Convention on Conventional Weapons* (CCW), and other domains such as small arms and light weapons (SA/LW) and armed violence reduction (AVR).

- ensuring data interoperability within the domain of the humanitarian sector
- ensuring that the data interoperability would not be restricted to a specific information management system.

Three different solutions to update maXML were proposed:

- **Basic solution** was a description of minimal changes to maXML to bring it up to date with current XML standards without causing any major changes on IMSMA
- **Intermediate solution** was a description of changes to maXML that would increase the interoperability with other systems, while having some effect on IMSMA
- **Advanced solution** was a description of the full update of the maXML structure, while possibly leading to major changes in IMSMA.

GICHD is in the process of selecting one of these solutions.

#### DATA CONSUMPTION

The maXML schema is driven by the need to be able to repurpose data into products that support many users. Humanitarian actors need a solid basis for planning their activities, donors want to prioritize projects to allocate funds, and media and academics need up-to-date information for articles on scientific studies, hence the need for machine readable data.

#### CURRENT USES OF maXML

**D-BOX** is a project funded by the European Union to develop a set of tools in support of the mine action community and can access information from a wide variety of sources. Among these, D-BOX can import data from IMSMA in maXML format and is intended to develop maXML export capability as well. The separate planning and operations tools can exchange information between each other, and there is a specific tool (D-BOX for sharing) developed for sharing between separate installations of D-BOX (e.g., between different countries or regions). This data exchange is implemented through the transfer of MediaWiki pages.

The **TIRAMISU Information Management System** (T-IMS) is another project funded by the European Union for humanitarian demining. The tool aims at receiving, collecting, and gathering tasks and reports, and compiling, analyzing, presenting, and communicating all relevant field data. T-IMS uses maXML as a communication protocol, internally and externally, and for the definition of information elements as well as user input. All communication to and from T-IMS is done via maXML. GICHD has been in touch with the developing company in order to ensure compatibility with IMSMA through the maXML import and export functionality.

The **Mine Action Reporting System** (MARS), developed by GICHD, is one example of a recently developed mobile data collection tool falling under the IMSMA applications category. MARS comprises three main parts: a field data entry mobile app (MARS Mobile), a web-based data management and administration portal (MARS Web), and cloud-based data storage (MARS Cloud). After

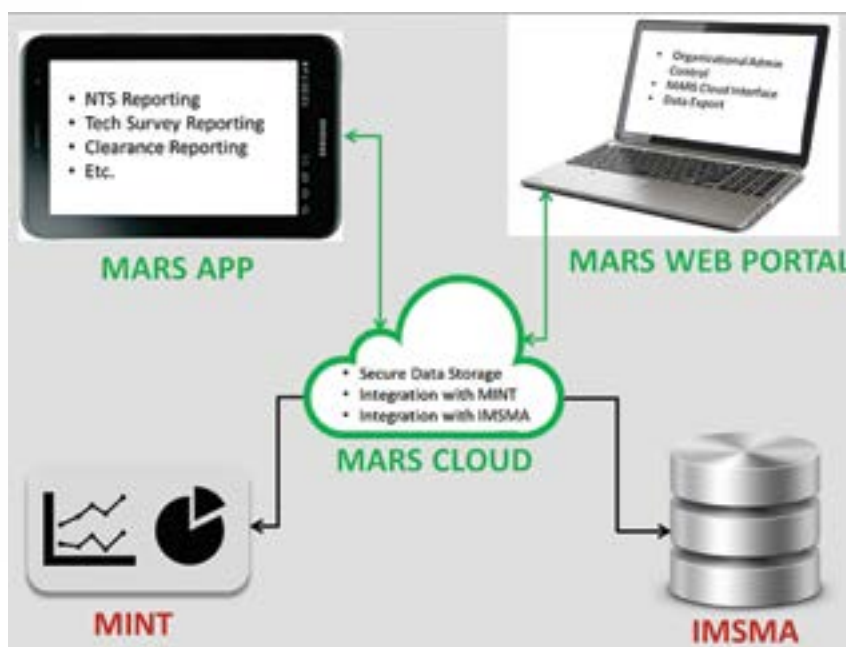


Figure 5. MARS-IMSMA integration via maXML.

initial configuration via MARS Web, authorized users can collect data in the field via custom developed data entry forms or forms designed in IMSMA and imported into MARS. The mobile application allows capturing GPS information identifying points and polygons with a few finger taps. As soon as the mobile device is connected to the internet, the collected data is synchronized with the MARS Cloud and made accessible for approval via the web portal. Finally, data collected via MARS can be imported into the IMSMA data repository.

#### FUTURE WORK

As a standard for exchanging operational data in mine action, maXML formalizes established terminology from the domain. It currently focuses on humanitarian profile data as well as core reference data, such as geographic information, ordinances, education, and quality management. Data according to the maXML vocabulary can currently be produced using the IMSMA software. maXML data already drive the first applications, including D-BOX, T-IMS, and MARS.

Defining the maXML vocabulary for the humanitarian system as a whole clearly goes beyond the capabilities and expertise of GICHD. In order to achieve this goal, the involvement of the global clusters in developing their respective components, such as vocabulary extensions and cluster-specific tools, is required. In order to increase interoperability with systems and communities outside of the humanitarian domain, maXML should be aligned with existing standard vocabularies. ©

See endnotes page 67

#### Dionysia Kontotasiou Project Manager GICHD



Dionysia Kontotasiou joined GICHD in March 2013 as a MediaWiki specialist. She is the project manager of CORD. In addition, Kontotasiou is the project manager of the Information Management System for Mine Action (IMSMA), and administrator of the in-house MediaWiki website that serves as IMSMA's documentation and support site.

Prior to joining GICHD, she was a research assistant in the Informatics and Telematics Institute in Thessaloniki, Greece. Kontotasiou earned a diploma in electrical and computer engineering from Aristotle University of Thessaloniki.

#### Olivier Cottray Head of Information Management GICHD



Olivier Cottray joined GICHD in January 2012, initially as the division's information services coordinator. As head of the Information Management Division, he is now in charge of managing the team that provides information management capacity development and technical support to the mine action community. Prior to joining

the GICHD, Olivier worked in humanitarian emergencies, running geographic information systems (GIS) support cells in U.N. and NGO field operations. Olivier completed a Bachelor of Science in geography and economics at the London School of Economics in 1998, and received a Master's in GIS and remote sensing from the University of Cambridge in 1999.



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Following the end of the Bosnian War in December 1995 and the Balkan floods of May 2014, Bosnia and Herzegovina continues to suffer from landmines and explosive remnants of war contamination. *The Journal* is seeking articles on lessons learned and remaining challenges for ongoing programs in the region.

#### FEATURE

##### Improvised Explosive Devices (IED) & Pressure Plate IEDs

As the number one cause of military casualties, IEDs are one of the greatest threats to civilians in Afghanistan, Iraq, Libya, and Syria, and becoming an increasing threat in Europe, the United Kingdom and the United States. How are traditional humanitarian CWD programs dealing with the increasing prevalence of IEDs and pressure plate IEDs?

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Publication: July 2017

#### SPOTLIGHT

##### Southeast Asia

How are international NGOs and national mine action operators in Southeast Asia addressing threats? What has changed in the way data is collected and analyzed? What lessons learned can be shared with the broader CWD community?

Of particular interest are Burma, Cambodia, Laos, Nepal, Thailand, and Vietnam.

#### FEATURE

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How has the prevalence of **mobile technology** changed the survey documentation process? What are some of the successes and challenges faced by CWD organizations when conducting surveys? How is the scope of a country's contamination measured? How is quality assurance measured prior to land release?

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